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NATURAL ENVIRONMENT RESEARCH COUNCIL
(INSTITUTE OF TERRESTRIAL ECOLOGY)

THIRD INTERIM REPORT TO THE NATURE CONSERVANCY COUNCIL ON THE BIOLOGICAL SURVEY OF BRITISH RAIL PROPERTY

(NCC/NERC CONTRACT NO F3/03/80 : ITE PROJECT NO 466)

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We are also indebted to colleagues at ITE for their advice and assistance with analytical techniques and methods and would like to thank Dr. R.G.H. Bunce, Mr. G.J. Moller and Mr. M.W. Shaw. Dr. S.B. Chapman kindly oversaw fieldwork during the summer months.

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SECTION 1 INTRODUCTION

1.1 General

This is the third interim report to the Nature Conservancy Council on the Biological Survey of British Rail Land. It is primarily concerned with the refinement of information collection, handling and assessment techniques, and does not, at a mid-point in the contract, attempt to make fundamental statements about the quality and distribution of biological species.

However, the range of variability of observed biota is recorded, not only for purposes of method evaluation, but also to draw attention to those areas which are likely to be of particular interest to the Nature Conservancy Council. Sites where any alteration of current management techniques might prove of concern have been noted, as have areas where additional research might prove especially fruitful.

Work completed during 1978 is described and proposed modifications outlined and discussed, the intention being to trace the development of ideas which will define the eventual shape of the project and to discuss results only as they are implicated in this process. The objectives of the survey have been defined in earlier reports (1977, 1978) and are not fully re-examined at this stage.

1.2 Liaison with British Rail and the Nature Conservancy Council

During the past year, work has again been carried out in close co-operation with British Rail. Contacts were established with Regional and Divisional Engineers (Permanent Way) in Southern and Western Regions, who supplied maps and information and who have been kept fully informed of the movements of the field team. Permission to work in the London Midland Region during 1979 has been granted by the Chief Civil Engineer, and members of his staff have supplied excellent line maps and given full assistance to the project. The team have again undertaken to observe safety precautions defined by British Rail.

Additional information concerning railway land management has been received. Of particular interest has been discussion about the sources and properties of ballasting materials (C. Beagley, pers. comm.). A list of quarries from which the ballast is derived is in preparation, although records of distribution, which depend on local and temporal availability, are difficult to trace. Previously, limestone ballast has been widely used, although after wetting

attrition problems are experienced and it is likely that limestone will gradually be entirely replaced by granite. This change will have some effect on the railway flora since the presence of geologically uncharacteristic ballast may introduce local modification to pH.

Further information has been received concerning herbicides, approved under the Agricultural Chemicals Approval Scheme, and in current use or proposed for future use on British Rail property. Table 1 lists herbicides approved for purchase by British Rail permanent way staff, whilst Table 2 gives those chemicals likely to be used by the major companies holding weed control contracts for British Rail property. Of particular interest is the inclusion of ammonium ethyl carbamoylphosphonate, or "Krenite" (E.I. du Pont de Nemours & Co.) in the former list. Krenite has been developed as a brush control agent having a very low toxicity to the majority of animal forms. It is presently undergoing trials by the British Rail Disinfestation Services and by chemical contractors to British Rail. Results to date have not been entirely consistent, although the virtual absence of known harmful side effects from this chemical strongly indicate its potential environmental value. Limited usage and more widespread trials are likely to be introduced in 1979.

A preliminary list of sites of particular interest occurring in Eastern, Southern and Western Regions has been sent to British Rail and to the Nature Conservancy Council, and some discussion concerning the ways in which such sites might best be protected or managed has been generated. Some of the alternatives already considered are described in Section 6. In one particular instance, location by a member of the team (J.O. Mountford) of a hitherto unrecorded species for Britain (Sell & West, in press) Hieracium zygophorum Hyl. (Hylander, 1943) growing together with Hieracium exotericum Jord. ex Bor., a rare alien, has led to cooperation between British Rail and the Nature Conservancy Council. It is hoped that the site will be sympathetically managed and that the populations of these rare or overlooked hawkweeds will be carefully monitored.

Advice concerning sites of suspected Biological Interest in Southern and Western Regions was received from staff members of the Nature Conservancy Council. Many of these sites were surveyed during 1978 (Section 3), although some bias was shown toward sites in South Wales and South-Western England, where particularly extensive and detailed information was made available.

Table 1.1. Approved list of weedkillers for BR purchase 1978.

I	For spraying of slopes (Selective Weedkillers)			
	Phortox 50	(Fisons)	2-4-5 T	
	Atladox	(Chipman)	Picloram and 2,4-D	
	Tordon 22K	(Dow-Chemical)	Picloram	(1)
	Kronite	(Dupont)	Ammonium ethyl carbamoylphosphonate	(2)
II	For spraying of track, cess, yards (Total Weedkillers)			
	Atrazine A.80	(Fisons)	Atrazine	
	Atlazin	(Chipman)	Aminotriazol and Atrazine	
	Destrol BR	(Borax)	Bromacil and Aminotrazol	(3)
	Destrol Super	(Borax)	Bromacil, Dalapon and 2,4-D	(3)
III	Granules for track, cess, yards (Total Weedkillers)			
	Chlorea	(Chipman)	Sodium chlorate, Atrazine, 2,4-D and Borax	
	Hydon	(Chipman)	Bromacil and Picloram	
	Borocil	(Borax)	Atrazine and Bromacil	
	Weedex A4G	(Ciba Geigy)	Atrazine	
IV	Dusting powder for yards, platforms, etc. (Total Weedkiller)			
	Atlacide Extra	(Chipman)	Sodium chlorate, Sodium metasilicate and Atrazine	

Notes:-

(1) Recently approved - Not on Supplies Managers Contract Advice.

(2) For experimental use - Not on the Agricultural Chemicals Approval Scheme, but considered to be a very safe chemical.

(3) For use by BR Spray Train only.

(Courtesy C. Beagley)

Table 1.2. Approved list of weedkillers for contractors use on BR property 1978.

I	**Fisons Spray Train**		
	(a) Track Spray		
	Herbazine 50	(Fisons)	Simazine
	Weedazol	(Fisons)	Aminotriazol
	Fisons R.250	(Fisons)	MCPA
	Fisons R.262	(Fisons)	2-3-6 TBA and MCPA
	(b) Slope Spray		
	Phortox 50	(Fisons)	2-4-5 T (April to August)
II	**Chipmans Spray Train**		
	(a) Track Spray		
	Residox	(Chipman)	Atrazine
	Atlazin	(Chipman)	Aminotriazol and Atrazine
	Tordon 22K	(Dow Chemical)	Picloram
	(b) Slope Spray		
	Chipman Brushwood Killer	(Chipman)	2.4-5 T
	Atladox	(Chipman)	Picloram and 2,4-D
	Tordon 22K	(Dow Chemical)	Picloram
III	**Chipmans Hand Spray Treatment**		
	(a) Track Treatment		
	As II (a) plus		
	Chipman 2,4-D	(Chipman)	2,4-D
	Chipko Diuron 80	(Chipman)	Diuron
	(b) Slope Treatment		
	As II (b)		

(Courtesy C. Beagley)

Comparable information for 1979 is being received from NCC Regional Officers whose areas coincide with the L.M.R.

1.3 Historical and Archival Researches

Historical and archival researches by Dr. J. Sheail have been largely completed and will be found separately bound.

1.4 Sites of particular Biological Interest*

During 1977, files were opened for sites deemed to be of particular biological interest. The criteria for a site from either the objective or the "biological interest" surveys to be filed, included one or more of the following:

a) The flora should be particularly characteristic of some aspects of the railway environment;
b) The site should contain rare or interesting species or species associations;
c) The flora should be diverse;
d) The site should provide a particularly good animal habitat;
e) The site should occur in a landscape otherwise lacking that kind of vegetation or habitat.

Methods of measuring the relationships between all kinds of railway sites are being introduced (Section 3.2) this year, but, until such time as a working system has been achieved, no attempt is made to relate these subjectively assessed sites to one another or to other components of the survey.

The files include descriptions of physical and vegetative properties of the sites, species lists, and, where appropriate, suggested management or conservation practices. Files have been completed for Eastern Region by Mr. J.O. Mountford who has had an opportunity to visit all the sites in question. They will be found separately bound as Appendix 6 to the present interim report.

1.5 The 1978 Survey

The 1978 survey took place in Southern and Western regions of British Rail. During the season (April-September), 171 sites were visited. Of these sites,

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* Use of the phrase "sites of particular biological interest" has been introduced to distinguish these from those occurring in the Biological Interest Survey (Section 3). Whilst a number (but by no means all) of sites from that survey are included in the former category, sites from the objective survey are also well represented.

60 were "randomly"* selected, 60 near adjacent cuttings and embankments, and 51 were sites about which information had been received from NCC staff members or for which documentation of some kind previously existed.

The sites were comparable with those visited in Eastern Region in 1977, although the method of choosing random and cutting/embankment sites was improved to give all stretches of rural track an equal opportunity of selection. Data collection was modified, and a system which, whilst retaining compatibility with previous work, was thought to be more appropriate to the disturbed and heterogeneous vegetation under consideration was introduced.

Classification of data into vegetation and site kinds was by I.S.A. (Hill, Bunce & Shaw, 1975) and the defined groupings additionally used in conjunction with reciprocal averaging ordination (Hill, 1973; Bunce & Smith, 1978) to help interpret spatial and environmental trends. Particular attention has been paid to quality and compatibility of input data and it has been decided to examine the relationship between variously modified data sets. A vegetation key using all available and compatible species data is in preparation, and it is hoped to use this key to relate the sites of notified biological interest to the more objective survey. The feasibility and usefulness of a site key is under consideration.

Much attention has been given to finding a suitable system of stratification which, whilst improving sampling efficiency and ease of interpretation, will not introduce too great a subjective bias.

The notified sites (Section 3) are considered separately from the random and cutting/embankment surveys (Section 2) although some attempt is made to draw their particular contributions together. A separate section written by Mr. J.O. Mountford and concerning some of the more interesting plant species recorded during the field season will be found (Section 4), and a list of additional species is given in Appendix 5. Photographic records have again been made and these are available for reference at Monks Wood.

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* Termed random but in fact stratified into British Rail Divisions.

1.6 Animal recording

It is generally accepted that the associations of a particular plant community or vegetation type may be assessed with some degree of accuracy after only a single visit. However, the amount of variation in animal observation introduced by such factors as weather and mobility requires that records be made more frequently to produce any useful or consistent information. The problem of animal recording is reinforced by the diversity of taxa present in most situations. Given a single short visit to each site in the railway survey, any attempt at animal recording with a view toward classification would seem, at best, inappropriate. However, given also that railway access is exceedingly limited and that the likelihood of revisiting many of the sites is small, some attempt to note and analyse the presence of the more readily observable species has been made.

During 1978, the responsibility for such recording was given to Mr. Alan Marsden, a first year sandwich course student from Brunel University. An edited version of his Industrial Training Report, in which some attempt to rationalise this difficult situation is made, is given in Section 5. Lists of observed species are included in that Section.

1.7 Staffing

During 1978, the Project Leader for this survey, Dr. J.M. Way, was transferred on secondment to the Department of the Environment. After a short interim period, when Dr. S.B. Chapman (ITE Furzebrook) assumed temporary responsibility, the present author took over leadership of the project. Whilst certain modifications will, of course, be made, it is intended that the change will not affect continuity, and that the high standards introduced by Dr. Way will be maintained.

SECTION 2 THE OBJECTIVE SURVEYS

2.1 Location of sites

The experience of 1977 led to certain changes in sampling procedure, in particular, new methods were sought to locate the sampling sites and to improve the homogeneity of quadrat data within those sites.

In Eastern Region, the number of random and cutting/embankment sites to be investigated within each of five defined rural areas was related to the length of track within that area. The areas coincided with, or were of more or less comparable size to, certain British Rail divisions. The random sites were located by reference to 10 km squares of the National Grid, and the cutting and embankment sites were those formations as near adjacent to one another and as close to the random site as possible, with the constraint that they should be on or within 15° of a North/South or an East/West orientation. The 10 km squares were selected by random numbers, and were searched, beginning medianly and proceeding in a clockwise direction, if necessary to adjacent squares, until a railway line was encountered. The site was located at the access point (bridge, level crossing, etc.) nearest to that encounter.

It was recognised that this method would not permit an equal opportunity of selection for all lengths of track as an equal length of track does not occur in each 10 km square and as all lengths of track are not equidistant from the centre of their respective squares. It was further apparent (although the intention had been purely pragmatic) that stratification or division into economic or comparable size areas would be unlikely to reflect vegetational differences.

The difficulty of unequal representation was overcome in 1978 by selecting random sites with reference only to the lengths of track involved (each rural running track mile becoming a unit for potential selection) and not by location with respect to co-ordinates of the National Grid. However, a practicable solution to the problems of stratification with relation to vegetation differences was not found at this stage.* Instead, Southern and Western Regions were divided into their component 13 administrative divisions (Map 1). Whilst

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* Stratification of railway property is considered in some detail in the discussion and outline of proposed work below (Section 6).

it was recognised that this division produced an economic stratification only, the division gave rise to convenient map working areas, simplified liaison with British Rail Divisional Engineers, and ensured that the sites to be sampled were widely distributed.

In practice, sites were located in the following way:-

a) Urban areas were excluded and the regions divided into their 13 component areas.

b) Rural mileage within each of those divisions was recorded and the individual miles ascribed numbers.

c) A total of 60 random and 60 cutting/embankment sites were proportionally allocated between the 13 divisions.

d) For each division, random numbers were generated within the recorded range. Corresponding map locations were found and the line searched for the closest access point (bridge, level crossing, etc.).

e) The access point defined the random site and the closest cutting and embankment, within the orientation constraints, were then located. A total of 30 East/West and 30 North/South formations were sought.

f) In the field, the 100 m random sites were measured by pacing away from the mile post closest to the access point. The four transects were located between either side of the track and the BR boundaries at both ends of the measured site.

The cutting and embankment sites were found in a similar way, except that the two transects recorded at each formation - a total of four for the paired sites - lay at the centre of each site.

2.2 Quadrat size, position and pattern

Field usage of nested, $1m^2$, $4m^2$, $25m^2$ and $50m^2$, quadrats (Bunce & Shaw, 1973) during 1977 indicated that these quadrats might not be entirely suitable for recording at railway sites. The most obvious and facile difficulty arose when the width of railway land to be investigated was less than that of the $50m^2$ quadrats. Of greater concern, however, are the vegetational gradients and discontinuities which change and occur within small distances both parallel to, and along the length of, the track (Niemi, 1969). Although the analytical methods used are powerful enough to cope with a certain degree of heterogeneity, and the nesting of quadrats will, by design, measure that degree, it was nevertheless thought likely that use of the larger quadrats would not produce sufficient information about pattern to justify measurement. Further, it was

considered that the placing of a single nested quadrat at each variable length transect (differences in track side width can be fairly extreme (Way, Sheail & Mountford, 1977)) would not satisfactorily describe the range of vegetation and, particularly, the more stable types occurring at some distance from the track in wider sections. Insufficient resources were available to increase the number of nested quadrats placed.

An alternative system was sought, where the units measured would be likely to be homogeneous, would be small enough to give some measurement of species association, and would be repeatable with sufficient frequency (within the available resource) to measure variability at the larger sites. At the same time, it was essential that any new sampling method should produce data compatible with that previously obtained.

It was decided that a $4m^2$ (2 x 2) quadrat would fulfil most of these requirements. It was thought that the amount of heterogeneity within such an area would be unlikely to perturb proposed mathematical classifications. The size is not too large to obscure species association information and is sufficiently small to enable a reasonable (in terms of vegetation diversity) number of samples to be recorded at each site. At wooded quadrats, where pattern is likely to be of a different scale, it was proposed to nest the $4m^2$ unit within a 25 m^2 (5 x 5) quadrat.

The choice of 4 and $25m^2$ quadrats was partially dictated by the inclusion of these sizes in the nested system in use in 1977. The data already collected would be compatible with the proposed method except in terms of the cover percentage estimate which previously referred only to the largest ($50m^2$) of the nested quadrats. Some authors (e.g. Hill and Evans, 1978) have found that percentage cover does not vary greatly with quadrat size, although the use of estimated quantitative data during fine mathematical analyses is in itself questionable. The matter is considered in greater detail below (2.4), where use of quantitative estimates is compared with use of incidence (presence/absence) data. Previously, it has been found (Dale and Williams, 1972; Shaw, 1978) that there is a tendency for qualitative data to retain more information than quantitative.

With the introduction of smaller quadrat sizes, the rules governing their disposition clearly had to be altered. Maintaining the use of transects between the track and boundary of British Rail property at the four corners of the

measured site (Way et al, 1978), the most effective distribution of quadrats along those transects was sought and the following alternatives considered:

"A) If the transect was less than 5 m in length, one 2 x 2 m quadrat would be recorded. The position of the centre point of the quadrat would be determined by use of random numbers so that the whole quadrat was on the transect.
B) If the transect was more than 5 m in length, the centre point of the transect should be stablished, and two 2 x 2 m quadrats recorded, one in either half. The centre point of the quadrats would be placed at random (by use of a dice or random tables, etc.) in the respective halves so that the quadrats themselves did not overlap. In the cases where the vegetation was scrub or woodland, so that a 25 m^2 quadrat was required, the critical transect length would be increased to 10 m.
C) Alternatively, if the transect was more than 5 m, the number of quadrats to be recorded would be increased for each 5 m increase in transect length. Thus, for a transect up to 10 m, there would be 2 quadrats, up to 15 m three quadrats, and so on, with the centre point of the quadrats placed at random within the increments.
D) Again, if the transect was more than 5 m, the number of quadrats should be increased geometrically, i.e. for a 10 m transect, two quadrats; for a 20 m transect, three quadrats; for a 40 m transect, four quadrats, and so on. The transect would then be divided in equal segments depending upon the number of quadrats to be taken, and the centre points of the quadrats determined by random numbers as before.
E) Finally, if the transect was more than 5 m, quadrats should be taken in clearly recognisable vegetation zones. " (Way, 1978, note from file).

It was decided to adopt option A for one $4m^2$ quadrat in any transect up to 5m, or for one $25m^2$ in any transect up to 10m. Having estimated the time taken to record a $4m^2$ quadrat, it was considered that option D, where additional quadrats were placed at geometrically increasing intervals, would prove feasible. Use of option E was vetoed because of the difficulties in making an "objective" decision in the field, and because subtleties in vegetation change or gradient may not be readily apparent. For the analytical techniques in use, a systematic collection of information is clearly to be preferred.

A table of ground rules is given in Appendix 4.

2.3 Information recording

Site, species, and quadrat information were recorded at all locations during 1977 and 1978. However, in 1978, modifications were made to the kinds of information recorded. There were three main reasons for this change.

a) It was essential that the main effort be put into collecting information appropriate to the kinds of analysis in use.

A vegetation code, developed during the reconnaissance (Way and Sheail, 1977) had been used to supplement species information. The categories in this code were subjective and depended on visual estimation of vegetation type and structure. It is established that subjective information of this kind, when coupled with more absolute (species presence) data, will reduce the reliability of any (mathematically assisted or not) analysis of that data. The contribution of estimated information to interpretation carries the same constraints and will tend to obviate any precision in the original technique. It was therefore decided to discontinue recording the vegetation code.

Until the present, estimated percentage cover has been considered an important component of the railway quadrat information, and, to this end, species cover and certain "cover categories" including bare ground, bryophyte mass, and litter have been recorded. In 1978, the number of these categories was expanded and percentage cover of open water, ballast, cinder, lichens and bare rock were also recorded. The effects of these estimates (most of which are for transient or heterogeneous features) on the analyses has been examined and the value or otherwise of their contribution is considered below (2.6, 2.7). It is likely that recording of these estimates will be discontinued in 1979.

b) On the other hand, it became apparent that some information of seeming importance was not being collected. Edaphically, the railway tends to be very disturbed. Soil profiles are largely undeveloped and little understood; drainage patterns depend on engineering practices; and conditions change very locally with ballast tipping and provenance. It was decided that a survey of soil type and structure, whilst extremely informative would be beyond the resources of the current project. However, it was thought possible to intensify pH sampling in relation to the increased number of quadrats (2.1) examined. Thus, suitable material was taken from the centre of every quadrat visited and was measured in the laboratory as soon as possible after collection. Additionally, estimates were made of the severity and age of ballast tipping at each quadrat.

Ballast is either limestone or granite (C. Beagley, pers. comm.; Section 1.2) and, whilst the sources of material are known, its distribution has been arbitrary, depending on availability at laying or replacement times. In 1979, a simple test, using hydrochloric acid, will be introduced to determine the nature of the ballast. The deposition of calcareous material in an otherwise acid habitat is likely to have interesting effects on the local flora.

Bryophytes and lichens have hitherto (in the context of this survey) only been considered in terms of estimated percentage cover. However, it is expected that a fairly characteristic flora exists and that it contains additional, and often very sensitive, information which would make a useful contribution to the analysis. It is hoped to begin species recording in 1979.

c) The revised size and distribution rules for quadrats (2.2) have also led to modifications in recording technique. The proformas were altered to accommodate these changes and completed examples of the kinds in use in 1978 are given in Appendix 4.

As in 1977, one site recording form, two animal and two plant species lists were recorded at each single (random) site, and two site and animal sheets and four plant species lists were completed at each paired (cutting and embankment) site. The number of quadrat sheets prepared was variable and proportional to the width of British Rail land occurring at each transect.

2.4 Analytical methods

Data collected during 1977 was classified by Indicator Species Analysis (Hill, Bunce and Shaw, 1975). However the derived classes contained an unacceptable degree of heterogeneity which did not greatly reduce with reasonable subdivision. The heterogeneity was almost certainly due to incompatibility between vegetation pattern and quadrat, or sample, size. Initially, data from only the largest of the nested quadrats ($50m^2$) was used, although subsequently, and for comparison, a classification of information from the $4m^2$ unit, quantified by cover estimates from the $50m^2$ quadrat, was prepared. This latter classification produced seemingly more homogeneous end groupings, although, in the absence of a simple mathematical method, no attempt other than purely subjective, was made to compare the two classifications. It is, however, possible to compare ordinations of similar data by measuring correlations between corresponding pairs of axes (Shaw, 1978).

The value of certain aspects of the information input, and, most particularly, those concerned with cover estimates and classes (Section 2.3), is currently being questioned and it has become essential to systematically compare allied sets of data. Ordination by reciprocal averaging (Hill, 1973) has therefore been introduced to the project and has been coupled to a technique correlating similarity between axes, and to a new method in which the homogeneity of clusters produced by different information input is examined.

This multiple approach has further, and at least equally important, advantages for interpretation. The use of classification alone (whether or not it depends on an initial ordination) will result in loss of spatial and directional information, whilst independent ordination clearly does not produce discrete grouping. In combination, however, such analytical techniques display spatial relationships between and within defined classes and can be used effectively to examine the influence of known environmental variables. Greig-Smith (1963) has pointed to the weakness of ordination in the absence of a good classification. Imposition of arbitrary or subjective grouping will reduce any ordination, however finely derived, to the level of the arbitrary classification. The converse also applies when spatial or directional differences are hazarded. Complimentary use of Indicator Species Analysis and Reciprocal Averaging, where each is objective, thus provides a useful analytical and investigative method.

Programmes for running both kinds of analysis on the PDP 11 at ITE Monks Wood were made available by Mr. M.W. Shaw of ITE Bangor. Data modifying and handling programmes were written at Monks Wood with the assistance of Mr. G.J. Moller. Correlation analysis was by standard methods.

The random and cutting/embankment surveys are not statistically compatible and have therefore been analysed independently. However, a purely pragmatic attempt to relate these to one another and to the Biological Interest Survey is being considered, and is discussed in Section 3.

2.5 Site analysis

The structure and vegetational composition of sites has not previously been analysed during this project, although the particular method of combining vegetation data is likely to produce useful results. Initially, it is of interest to determine whether the concept of a site in the railway context is valid. It is possible that the amount of heterogeneity and overlap present in and between

all except a few sites makes 'site' as defined in this survey, a not very useful category. However, if there is sufficient distinction between sites, the unit may be of use for future interpretation, especially in a geographical context, and for correlation with NCC information outside the immediate survey. On the other hand, it may prove necessary to base all analyses on an understanding of vegetation types and continua which occur within and between sites.

The site analyses were based on a species frequency which was found by pooling quadrat and species list data. Four frequency classes were used and these were based on percentage, rather than absolute, occurrence since the number of quadrats, and hence bits of information, varied from site to site. The analyses have been run on compatible random site data and cover estimates have not been included.

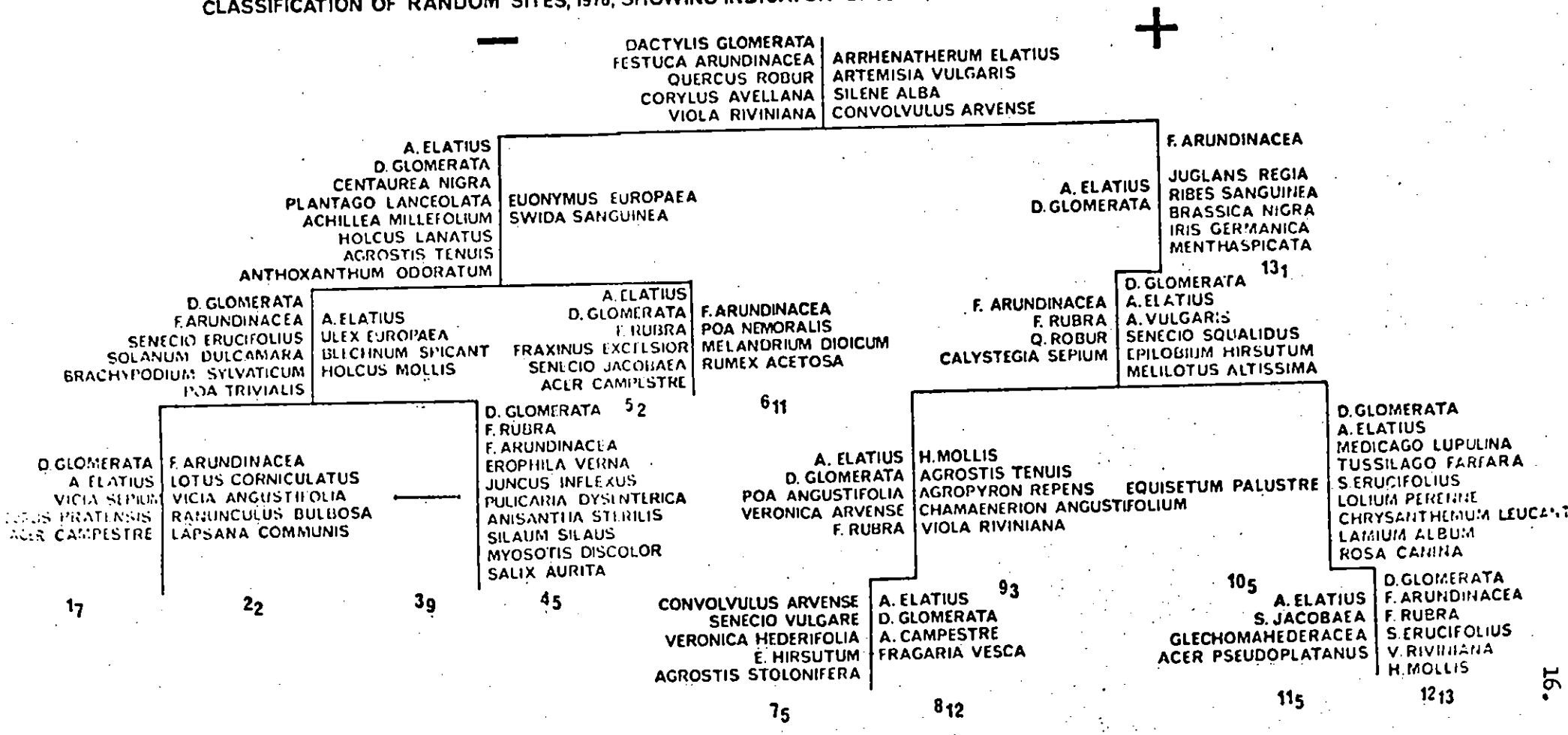
Indicator Species Analysis of the random data (60 sites) gave rise to the following 13 classes. The indicators involved in successive division are given in Table 2.1, which also shows the relationship between the terminal groups.

1. Rank nitrophilous vegetation, characterised by stands of Urtica dioica, some relict woodland species and scrub with Rubus fruticosus and Arrhenatherum elatius. The seven sites in this class are fairly disturbed and most show signs of scrub clearance. They occur on well-drained and mainly sloping formations above varied geological strata and drift. pH 6-8. Occurrence 12%.

2. Dry scrub and grassland on shallow soil. Characterised by Trisetum flavescens and calcicolous scrubby species. Two well-drained sites are included here, one is a Cretaceous (upper chalk) cutting with unstable scrub and some grassland (pH >7), the other occurs on Eocene Thanet beds and supports dry grassland (pH 5.2-7.3). 3%.

3. Acid grassland sites with encroaching scrub, bramble and bracken. These sites are characterised by Holcus mollis, Festuca rubra and A. elatius with invasive species including Ulex europaeus, Rhododendron ponticum and Prunus spinosa. Cryptogams are well represented. The nine sites lie on grits, shales and sandstones. pH <6 with some local anomalies introduced by limestone ballast. Drainage moderate to slightly impeded, and sites often with indications of earlier scrub clearance and burning. Occurrence 15%.

CLASSIFICATION OF RANDOM SITES, 1978, SHOWING INDICATOR SPECIES, END GROUPINGS AND LEVELS OF DIVISION



4. Damp or acid sites with some woodland. These are characterised by Molinia caerulea and Deschampsia flexuosa with Quercus petraea (Q. robur on the South-western peninsula), introduced conifers, and sallows and Juncus spp. where wet. The five sites occur on slates, shales and grit and generally have a low (<6) pH. 8%.

5. Species rich acid woodland. A single and interesting site with a diverse deciduous woodland flora. Q. robur over Ilex aquifolia. On alluvium over slate and lying between the Camel River and a coniferous plantation which occupied part of the site. pH <5.1.

6. Recently cleared and/or burnt calcicolous woodland. Sites characterised by much bare soil, stumps and cinder. Woodland, relict and colonising species include Clematis vitalba, Swida sanguinea, Fraxinus excelsior and Acer campestre. 2 sites, both on limestone with pH >6.8. 3%.

7. Damp neutral grassland. Generally occurring on low embankments with drainage ditches or small streams. Characterised by A. elatius with some meadow species and aquatics. Some encroaching scrub. Five sites pH 6-8, mainly on alluvial or head deposits. 9%.

8. Dry grassland with invasive scrub or becoming predominantly scrubby and eventually woody. A. elatius with Dactylis glomerata characterise the grassland and invasive woody species include Rosa canina, Ligustrum vulgare, S. sanguinea, Corylus avellana and Q. robur. The inclusion of oak over hazel woodland sites suggests that further subdivision of the class would be useful. There are 12 sites, mainly on clay but with some on chalk or sandstone. pH very variable. Occurrence 20%.

9. Disturbed acid sites, weedy, and with somewhat impeded drainage. Species poor Arrhenatherum grassland characterised by invasive P. aquilinum, R. fruticosus, Equisetum arvense and Cirsium arvense. Some garden escapes noted. Three sites on sandstone or clay. pH usually <6. 5%.

10. Sites including marsh and aquatic vegetation. Characterised by E. arvense, Phragmites communis, Chamaenerion angustifolium, Filipendula ulmaria and including such species as Caltha palustris and Oenanthe crocata. Five sites with one slightly anomalous inclusion of a narrow flat dominated by E. arvense. Mainly on alluvium with pH >6. 8%.

11. Base-rich scrub and grassland sites influenced by streams or ditches. Arrhenatherum grassland with tall herbs, U. dioica and invasive Rubus fruticosus. Some deciduous woodland species. Five sites on alluvium with pH >6.5 8%.

12. Blackthorn scrub with coarse grassland. Prunus spinosa with Crataegus monogyna and species poor Bromus/Arrhenatherum grassland. Three sites on varied geological strata but all occupying low cuttings with more or less extensive grass and cinder flats. pH 6.0-8.5 5%.

13. A single site with Arrhenatherum/Agropyron grassland and garden escapes including Juglans regia, Iris germanica and Monstera delicosa. Brickearth over Cretaceous upper chalk. pH 7.

The I.S.A. was initially taken to four levels of division giving rise to a potential 4^2 (16) classes where no previous terminations occur. With a restricted number of sites to classify (60 in this test case) 16 seemed a reasonable level at which to stop subdivision. However, classes having fewer than three members were terminated, and this termination occurred once in the second division and twice in the third division. Occurrence of a terminal group in the second division led to considerable heterogeneity (effectively insufficient division) in the end classes on the same side of the dichotomy, and it was found useful to subdivide these further. A total of 13 reasonably homogeneous classes resulted (Table 2.1).

At each level of division, a number of "misclassifications" (Hill, Bunce & Shaw, 1975) occurred due to the heterogeneous nature of the combined site data. However, this heterogeneity retains considerable information, which becomes apparent in the capacity to link allied sites in a seemingly sensible and consistent way.

The character and relative distances of the linkages were examined by ordination of the data with Reciprocal Averaging (Hill, 1973) and by plotting the I.S.A. classes against the two dimensional matrix formed between the first and second axes of the ordination. With the exception of those classes which terminated early during I.S.A. and which were peripherally placed on the matrix, a variable degree of overlap occurred. It is unlikely that this overlap reflects any great inconsistency between the kinds of analyses used, since, during I.S.A. the multivariate data is scaled by Reciprocal Average prior to divisive

clustering. The combination of techniques used here merely rescales the clusters within an N-dimensional attribute space when N ordination axes are used.

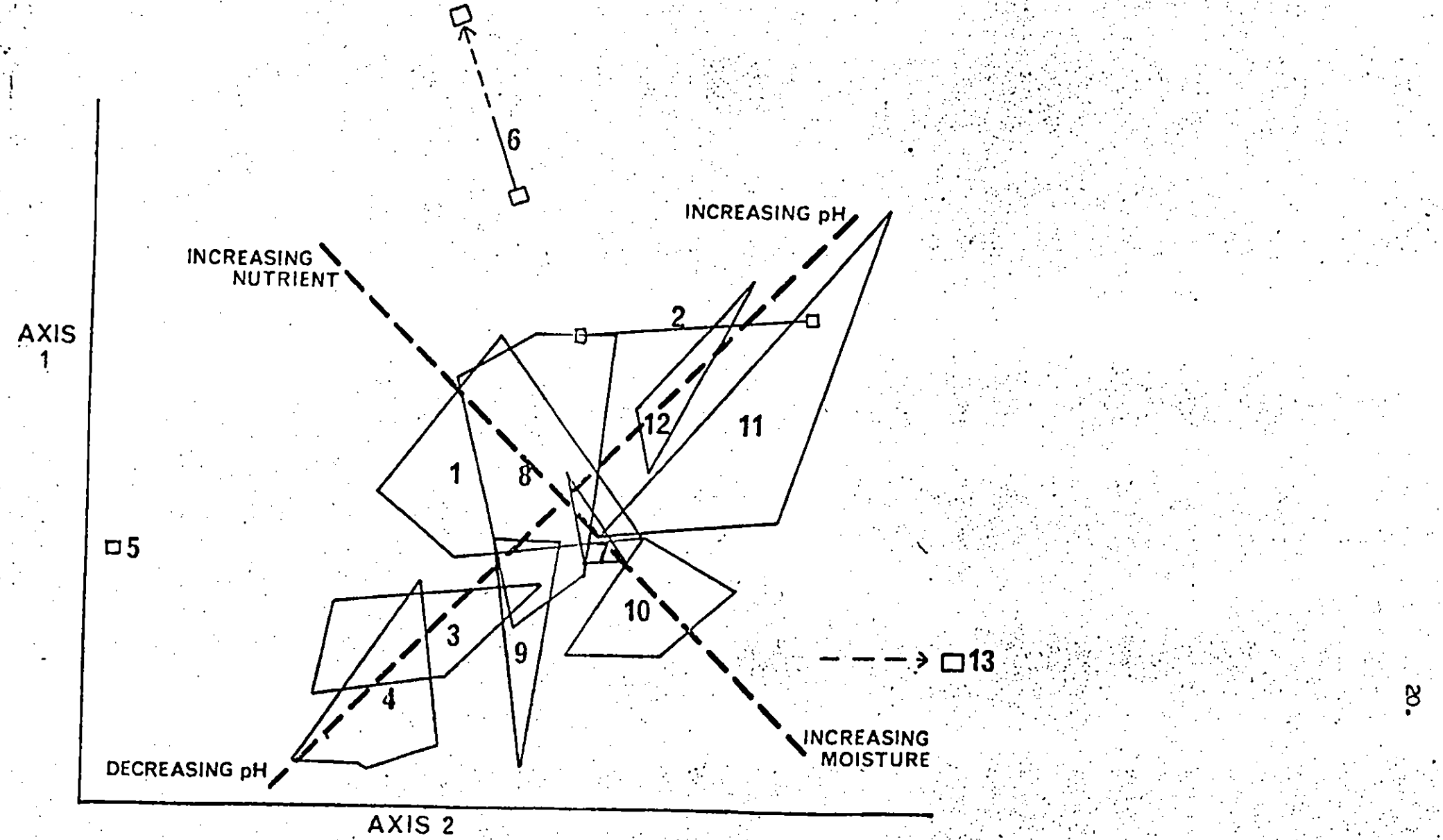
By inspection, observed and recorded environmental gradients were superimposed on the ordination, the best fit occurring with respect to pH and to an apparently reciprocal gradient between nutrient status and drainage (Table 2.2). The relationship between classes and the process of classification was examined with respect to these environmental gradients.

The initial I.S.A. dichotomy separated sites occurring on acid (classes 3, 4, 5) or thin (class 2) soils or those with radical nutrient status (disturbed by burning (6) or local nitrification (1)) from those with calcicolous (11, 12) and marsh or aquatic forms (7, 10) or having a high proportion of garden escapes or aliens (9, 13). On the negative side, the next division removed peripheral groups without close linkage (5, 6), and subsequent division occurred first with respect to pH (1, 2 : 3, 4) and then roughly along the nutrient:drainage gradient (1 : 2; 3 : 4). On the positive side, after termination of class 13 at the unbalanced first division, the next split reflected the initial dichotomy, and subsequent grouping occurred along the nutrient:drainage (7 : 8, 9; 10 : 11, 12; 11 : 12) and pH (8 : 9) gradients. In some cases where definitive properties were shared, superficially unlikely allocations were made. Thus, the highly calcicolous class 2 is allocated to the more acidic (negative) side of the initial dichotomy by virtue of possessing thin, dry soils, whilst in the acidic class 9, the converse applies, and calciphobic sites will be found grouped with the basophiles. Further inspection will suggest several other apparent anomalies.

It will also be observed that the imposed environmental axes do not conform to the ordination axes, which, in conjunction with the overlap observed between classes on the two dimensional matrix, indicates that a greater number of dimensions are required to define and describe the attribute space occupied by these site classes. Clearly, the number of dimensions needed is inversely proportional to the between class heterogeneity, and hence to the quantity and quality of involved environmental vectors.

The proposed interpretation is therefore over-simplified. However, it has been introduced to provide a basis for discussion of the merits of including site analyses in the project, and the following points arise.

IMPOSITION OF I.S.A. CLASSES, 1-13 AND ENVIRONMENTAL VECTORS ON THE RECIPROCAL AVERAGEING ORDINATION OF RANDOM SITES IN SOUTHERN AND WESTERN REGIONS



a. Whilst it is apparent that a unit of site size will be internally heterogeneous and that the kinds and distribution of vegetation will vary between sites, patterns exist which are sufficiently recurrent to establish at least some homogeneous site classes.

b. Certain vectors contributing to the clustering of these classes may be identified, and it is of interest that these do not necessarily correspond with factors influencing classification at smaller scales (Section 2.6). For example, when $4m^2$ quadrat data are examined in a comparable way, the fundamental dichotomy occurs between herbaceous and woody vegetation, reflecting local structure. In the railway situation, this structure is largely determined by management (herbicide spraying, ballast tipping, etc.) which, at the quadrat scale, is likely to be the most influential divisive vector. However, at the site scale, this influence is less important, and the overriding factors become drainage, pH and nutrient status. It is expected that if the scale were again increased the determinants would be climate and geology (Section 6).

The kinds of information derived from site analysis therefore contribute to understanding local pattern and to relating different scales of pattern within the railway network.

Site information is likely to be of practical use to the Nature Conservancy Council for identifying areas of particular interest, and since homogeneous site classes can be recognised, sites are potentially useful as sampling units for a proposed geographical stratification of British Rail property (Section 6).

2.6 Quadrat analysis .

Quadrat data were analysed with the intention of defining and distinguishing homogeneous vegetation classes. The reduction of quadrat size (2.2) was introduced with this analysis in mind and preliminary results, comparing the kinds of end groups produced, indicated that the smaller sampling unit led to a "more recognisable" classification. The question has not been examined in any greater detail here and has become academic since any further alteration in quadrat size would lead to an unacceptable degree of incompatibility in the information obtained from different regions of British Rail. However, the question of the kinds and degree of weighting (in terms of cover classes and estimates) to be placed on the collected data, and the usefulness of the particular clustering techniques employed, provide a continuing source of interest and experiment.

Indicator species analyses and reciprocal averaging ordinations were run on the 1978 sets of random quadrat data, with and without (i.e. quantitative and incidence) species cover estimates and cover classes (referring to contributions by factors other than vascular plants). The clusters were considerably perturbed and condensed by a small number of quadrats (3%) occupying over a quarter of the end classes or matrices. These were a distinctive and diverse group of quadrats occurring on cinder flats. Having noted their contribution and relevance, it was decided to remove them from the analyses in order to expand the distances and clarify the relationships between other, more homogeneous, groupings. The following discussion refers to all other random quadrat data collected in 1978.

An indication of the similarity between quantitative and incidence data may be found by a regression analysis of the first axes of the two reciprocal averaging ordinations (Shaw, 1978). The correlation coefficient of X/Y was found to be 0.28689 when X was the first axis of cover, and Y of incidence data. This coefficient does not indicate a statistically significant correlation, and further examination of the influence of cover information on clustering of this data was necessary before any value judgement could be made.

The composition and derivation of the end classes of the respective I.S.A.s were therefore compared (Table 2.3). Although initial divisions were not dissimilar, divergence at each successive level was marked and was compounded by the hierarchical nature of the technique.

Level 1. In both sets of data, the initial dichotomy occurred between woody and predominantly grassy vegetation. This kind of physiognomic classification is characteristic of the first division of all I.S.A.s run on railway data to date.

Level 2. Taking the negative side of the dichotomy, the next split occurred between grassy and more weedy, herbaceous vegetation. Where cover was a component, all damp or poorly-drained quadrats were placed on the herbaceous side of the split, which had the eventual effect of disassociating some kinds of grassland. On the positive side of the division, the second level split was between scrub and more stable woodland. Again, quadrat water relations were the main cause of variation between the divisions, and whilst incidence data split fairly strictly between scrub and woodland, cover data segregated all

wet or poorly drained quadrats, and included some open scrub with the woodland section.

The effect of these second level divisions was to give rise to four classes, grassland, weedy vegetation, scrub and woodland, broadly similar in both sets of data, although shifted between sets with respect to water status. For clarity, the further subdivisions are examined under these group headings.

Grassland

The grasslands divided first in relation to pH, and then with respect to stability or the degree of disturbance and extent of invasive scrub. In the calcicolous grassland groups, incidence data separated the very dry, disturbed and brambly quadrats (101 quadrats) from species-rich grassland in which some woody species occurred (19 quadrats). On the other hand, cover data separated dry and often disturbed chalk grassland (31 quadrats) from quadrats with invasive scrub (91 quadrats), earlier division having removed damp quadrats from this part of the hierarchy.

With incidence data, the acid grasslands were separated (56 : 18 quadrats) by the presence of woody or woodland (e.g. Teucrium scorodonia) species, whilst quantitative data split a small group of Molinia heaths (4 quadrats) from the remainder (25 quadrats) in which invasive scrub was important. Damp acid grasslands were included elsewhere.

Weedy vegetation

Quantitative data having included much of the damp grassy or herbaceous vegetation here, the first split was with respect to a moisture gradient. Subsequently, disturbed stands dominated by Chamaenerion angustifolium (19 quadrats) were separated from those with ditch or aquatic vegetation (55 quadrats), whilst, on the drier side, disturbed vegetation was divided on the presence (82 quadrats) or absence (14 quadrats) of bramble and nettle.

Incidence data produced a comparable, (although reversed, Table 2.3) first division, which led to the establishment of reed beds (18 quadrats) and coarse herbaceous vegetation typical of lower, or damp, embankment slopes (69 quadrats) as end groups on the wetter side of the dichotomy. On the drier side, weedy and herbaceous quadrats (45 quadrats) typical of better drained, disturbed slopes, were recognised as distinct from cinder vegetation

(13 quadrats) usually found along the cess. (The more extreme types of such cinder vegetation were previously removed from the analysis (above).)

Woodland

Quantitative and incidence data produced dissimilar divisions. With the former, a split was induced between strongly calcicolous and other woodland types. The calcicoles subsequently divided into chalk scrub (37 quadrats) and dry, basic scrub and woodland (86 quadrats), whilst the base-poor woodlands subdivided with respect to the dominant oak: Quercus robur in the south-western peninsula (39 quadrats) and Q. petraea elsewhere.

With incidence data, a small (4 quadrats) homogeneous group of damp alder woodland (not recognised elsewhere) was removed initially, and subdivision in this group did not produce any useful additional information. The remaining woodlands divided with respect to pH, segregating calcicolous woodland (92 quadrats) from the base-poor types (48 quadrats). Both of these groups could usefully have been subdivided, the indicator species being closely comparable with those determining the previous level split in quantitative data.

Scrub

The scrubby quadrats initially divided with respect to moisture, willow and horsetail being indicator species for the damper side where, with cover data, further subdivision distinguished quadrats with sallow and some reed (7 quadrats) from damp, blackthorn thickets (11 quadrats). Incidence data removed two curious quadrats spanning a ditch under Salix fragilis from remaining damp scrubby sites (9 quadrats). On the other side of the dichotomy, dry scrub with hawthorn (59 quadrats) was separated by incidence data from scrub with more woodland and fern species (15 quadrats) (blackthorn occurring in both groups), whilst cover data recognised dry blackthorn thickets and segregated these from rough, brambly, vegetation. Most of the more open species-rich scrub had been included in the woodland part of the hierarchy by cover data.

Since, in many instances, the data are continuously variable, some degree of sense can be made out of both classifications. In one area, cover data may produce a better distinction, as between the Quercus robur and Q. petraea dominated acid woodlands, whilst elsewhere, in the recognition of alder stands or the grouping of species rich grasslands or reed swamp, incidence data may be preferred.

It was thought that further subdivision might produce more compatible groupings, but the investigation of this possibility merely served to underline the problems associated with hierarchical classification, where information is channelled at each level and becomes unavailable for reconsideration or reentry. This channelling led to a certain amount of linkage or similarity in classes widely separated in the one-dimensional terminal array. Whilst it is possible to examine the extent of this similarity by measuring the degree of overlap following imposition of the classes on the complementary two or multi-dimensional ordination (Table 2.2), it would clearly be preferable to produce more discrete classes initially.

Thus, rather than solving the problem of whether or not to include quantitative data, the exercise has raised the further question of whether a hierarchical classification is suitable for these kinds of data (other than as a measure to produce an identification key - Section 3).

A method was therefore sought whereby comparison could be made between the outcomes of various kinds of classifications using variously modified sets of input data. In order to make this comparison, some definition of the "best" classification had first to be found. If it is accepted that "most homogeneous" is a relevant standard for vegetation classes, then a number of possibilities become available. Standard deviations of vegetation classes (species distribution in the original paper by Whittaker, 1960 (Whittaker, 1973)) measured along a defined environmental gradient can be used as an indication of the homogeneity of those classes with respect to the gradient. The average standard deviation for two or more sets of equivalent data can be compared, the lower figure indicating greater homogeneity.

In this case, where no defined environmental gradient exists, the first axis of ordination was considered a suitable alternative. Use of this coordinate as the gradient is particularly apt where the ordination provides information on which the classification is based (as occurs with reciprocal averaging and indicator species analysis (Hill et al, 1975)).

To compare the terminal classes derived from quantitative and incidence data means and standard deviations (n-1) of I.S.A. classes were calculated against respective first co-ordinates of Reciprocal Averaging ordinations. The standard deviations were summed and averaged and gave the scores of 7.87 and 8.52 for

quantitative and incidence data respectively. These figures are not significant at the 5% level. However, the quantitative data are composed of percentage cover estimates for higher plants as well as classes referring to other (non-vascular plant) cover categories. It is likely that any merit found from including the former, is masked by the latter categories and it is therefore proposed to examine these situations separately.

It is further proposed to extend the method to compare other non-hierarchical clustering techniques with I.S.A. since the preliminary analyses here indicate that the method is not entirely suitable for sorting the continuously variable kinds of vegetation encountered on British Rail property.

Meanwhile the collected data will continue to be examined from as many points of view as possible, so that inherent information will not be overlooked or discarded, and so that a reasonable assessment of vegetation types and gradients may be made.

SECTION 3 THE BIOLOGICAL INTEREST SURVEY

3.1 Information collection

Methods were not altered during 1978, and the reader is referred to the previous interim report (Way et al, 1978) for a discussion of these.

During the season, 52 sites were visited, 37 of which were at the direct request of the Nature Conservancy Council, 9 were based on information from County Floras, and 7 were discovered during the course of the survey and considered sufficiently interesting to examine. The latter group tended to be of a consistently high standard, whilst "flora sites" were often found to have deliberately vague localities or to have suffered from changing management practices or interference. The NCC sites partially comprised areas of track adjacent to SSSIs (biological and geological) which were visited to assess any railway contribution, and partially other known localities thought likely to support an interesting biota. Where these reflected the first-hand knowledge of local NCC staff, they were often of considerable importance.

Sites of particular value in Southern and Western Regions for which files will be opened are listed (Table 3.1) and further information will be found in Appendices 1-3, where short descriptions are given for all sites recorded during 1978.

Files have been completed by Mr. J.O. Mountford (Appendix 5) for all outstanding sites visited in Eastern Region during 1977.

3.2 Discussion

As yet, no mention of strictly relating Biological Interest Sites to those recorded in the objective survey has been introduced. Whilst judgements concerning the conservation value of the sites have been made, it would clearly be of value to make a direct comparison between all kinds of sites, in order to establish more clearly which factors are important and how extensive the areas of particular interest are.

The following approaches are being considered and it is likely that they will be combined to further this improved exchange of information:

Table 3.1. Biological Interest Sites: 1978.

A composite list of the more valuable localities extracted from Random (R), 14%; Cutting/Embankment (CE), 37%; and Biological Interest surveys (B), 49%.

(a) Southern Region:

CE87	TR 076530	Julliberrie Downs
R90	TR 258482	Shepherdswell
CE83/R84	TQ 298142	Clayton
R81/CE80	SU 541072	Titchfield
CE79	SU 738170	Glass Brow
R78/B69	SU 290001	Setley
CE74	SY 604972	Langcombe
CE76/B67	SU 227391	Newton Toney
B70	SU 252271	West Dean

(b) Western Region:

B92	SP 409152	Combe Cutting
CE117	SU 024811	Trow Lane
B107	ST 865696	Corsham
CE114	ST 650798	Winterbourne Down
B94	SW 933598	St. Dennis Junction
B102	SX 377578	Lynher Estuary
CE64	SS 458236	Landcross
CE65	SS 652000	Greenslade Bridge
B62/CE69	SX 441661	Furzehill
R71	SX 709605	South Brent
B56/CE61	ST 521286	Charlton Mackrell
B65	ST 717409	Wanstrow
B85	SO 790042	Five Acre Grove
B86	SO 950017	Hailey Farm Cutting
B105	SO 914028	Frampton Mansell
CE112	SO 901457	Besford
B76	SM 926304	Heathfield
B77	SS 125997	Tenby Burrows
B79	SN 36 07	St. Ishmael
B81	SN 417026	Ffrwd Farm Mire

a) An environmental stratification of the British Rail network is being produced (Section 6) and it will become possible to relate all sites of Biological Interest to particular strata and hence to other kinds of sites.

b) It is proposed to make a vegetation key, using all previously collected information, and to test this key at sites of Biological Interest. It is hoped to establish relationships by identification of defined vegetation types.

The key will be produced using Indicator Species Analysis (Hill et al, 1975), end classes defining vegetation (for this purpose only - Section 2.6) and Indicator Species the pathway through which these types are reached.

Some difficulty has been experienced with keys of this kind owing to the presence of "misclassifications". These are quadrats which ought, by the sum of relationships, to belong to a particular class, but which, lacking the necessary indicators, are found on the wrong side of the key. Shaw (1978) has introduced a modification to the I.S.A. programme which should, at least partially, overcome this problem. The data are first overdivided, producing very small homogeneous end classes which are re-entered as units into a subsequent I.S.A. This procedure has the effect of enabling the relationships between all groups to be reconsidered, and hence of reducing the numbers of misclassifications.

c) In order to test the key, a sampling system will have to be introduced, and it is proposed to record species data within quadrats at the same time, so as to bring the kind of information collected into line with that recorded during the objective survey.

The positioning of transects, and hence quadrats, cannot be entirely comparable with the objective survey, since sites of Biological Interest do not have a defined length. It therefore becomes necessary to find some way of consistently locating samples. A possible method, following inspection of the site, is to establish reasonable limits and to record within those limits. It is likely that a maximum length of 200 m will be acceptable, and that, where boundaries are ill-defined, the site will be taken to commence from the mile post closest to the access point. To avoid "edge" effects or the recording of marginal information, transects would be located 50 m in from either established boundary, and the positioning (at right angles to the track) and numbering (a total of four) of the transects would correspond to the objective survey. In

the case of the area of interest being 100 m long or less, only two such transects would be placed. Positioning of quadrats along the transects and use of recording proformas would be as elsewhere (Section 2.2, 3). Two species lists, one for either side of the line, would be made.

Where a site is judged to be of particular interest, records of the kinds previously made for biological interest sites will be completed to facilitate the preparation of site files.

SECTION 4 SOME CHARACTERISTIC RAILWAY PLANTS

4.1 Introduction

Most vegetation occurring on British Rail land is not unique, but some particularly interesting habitats are present in which characteristic species (and associations) may be found.

A table (Table 4.1) has been prepared from the county floras published since 1930, giving the species most frequently recorded in railway situations. Some of these species may be modal (Curtis, 1959) whilst others have a more widespread distribution. Except where the range is extremely limited, e.g. Cerastium brachypetalum, Linaria supina and Corrigiola litoralis, it is not always easy to distinguish between these alternatives. However, the Nature Conservation Review (1977) lists certain prevalently "ferroviatic" species and these have been marked with an asterisk.

The floras list three major habitat types for these characteristic railway species:

(i) Cinder and ballast: of the permanent way, station yards and sidings, and dumped on embankment slopes.

(ii) Stonework: on bridges, platforms and railway buildings, and once kept artificially moist by the condensation from steam locomotives (Dony, 1953).

(iii) Grassland: particularly where it is regularly burnt.

Eight characteristic species have been selected for further discussion here. The choice arose from field experience of those plants making some of the most interesting contributions to the railway flora, and stresses the species encountered during the 1978 field work.

4.2 Equisetum arvense L.

Equisetum arvense is mentioned in the Warwickshire Flora (Cadbury et al, 1971) as the species with the greatest frequency on railway lines (94%, Table 4.2). It is a very common plant throughout the UK, with a wide range of habitats, including cultivated, waste and rough grassy places, damp ground and dune slacks, and also occurring in deciduous woodland and scrub, gravel pits and quarries. On railway land, the upright form occurs abundantly on banks and may become dominant on ballast-strewn slopes. The prostrate form (var. decumbens

Table 4.1. Typical Railway Species.

Lists of plants cited as occurring on railway tracks, banks or land in more than 10 county floras or similar publications.
(* Railways mentioned as a main habitat in "The Nature Conservation Review")

A. > 40 records:

* Chaenorhinum minus

B. 30-39 records:

* Senecio viscosus

C. 20-29 records:

* Diplotaxis muralis
* Cardaria draba
Arabidopsis thaliana
Reseda luteola
Reseda lutea
Medicago s. sativa
Lathyrus latifolius
* Fragaria x ananassa
Epilobium angustifolium
* Linaria repens
Linaria vulgaris
Valerianella locusta
Leucanthemum vulgare
* Senecio squalidus
Tragopogon pratensis
Pilosella aurantiaca s.l.
Vulpia myuros

D. 15-19 records:

Equisetum arvense
Ceterach officinarum
Papaver dubium
Lepidium heterophyllum
Erophila verna
Sisymbrium orientale
Silene vulgaris
Cerastium diffusum
* Sagina a. apetala
Arenaria leptoclados
Geranium pyrenaicum
Cytisus scoparius
Ononis repens
Melilotus altissima
Melilotus officinalis
Melilotus alba
Trifolium medium
Anthyllis vulneraria
* Vicia hirsuta
Vicia sativa ssp. nigra
Rubus fruticosus s.l.
Sanguisorba officinalis
Sedum acre
Oenothera biennis
Foeniculum vulgare
Pastinaca sativa
* Euphorbia cyparissias
Primula veris
Primula vulgaris
Echium vulgare
Convolvulus arvensis
Potentilla reptans
Galium mollugo
Centranthus ruber
Tussilago farfara
Erigeron acer
Erigeron canadensis
Cirsium arvense
Centaurea scabiosa
Picris hieracioides
Hieracium strumosum
Crepis vesicaria
Vulpia bromoides
Catapodium rigidum

E. 10-14 records:

Phyllitis scolopendrium
Asplenium adiantum-nigrum
Asplenium trichomanes
Asplenium ruta-muraria
Cystopteris fragilis
Aquilegia vulgaris
Papaver argemone
Diplotaxis tenuifolia
Lepidium campestre
Cochlearia danica
Cardamine hirsuta
* Bunias orientalis
Armoracia rusticana
Barbarea verna
Erysimum cheiranthoides
Sisymbrium altissimum

Table 4.1 (continued).

Viola hirta
Polygala vulgaris
Hypericum perforatum
Silene alba
Saponaria officinalis
* Sagina apetala ssp. erecta
* Minuartia hybrida
Arenaria serpyllifolia s.l.
Malva moschata
Linum catharticum
Geranium pratense
Geranium columbinum
Erodium cicutarium
Ulex europaeus
Medicago lupulina
Melilotus indica
Trifolium pratense
Trifolium arvense
Trifolium campestre
Trifolium dubium
Lotus corniculatus
Lotus tenuis
* Coronilla varia
Onobrychis viciifolia
Vicia tetrasperma
Vicia cracca
Lathyrus pratensis
Lathyrus sylvestris
Fragaria vesca
Poterium sanguisorba
Poterium polygamum
* Epilobium adenocaulon
Epilobium roseum
Oenothera erythrosepala
Pimpinella saxifraga
Heracleum sphondylium
Daucus carota
Euphorbia esula s.l.

Polygonum cuspidatum
Rumex acetosella s.l.
Blackstonia perfoliata
Verbascum thapsus
Verbascum nigrum
Antirrhinum majus
Origanum vulgare
Acinos arvensis
Clinopodium vulgare
Lamium album
Campanula rapunculoides
Galium verum
Knautia arvensis
Senecio erucifolius
Senecio vulgaris (rayed form)
Solidago canadensis
Aster novi-belgii
Achillea millefolium
Tanacetum vulgare
Artemisia vulgaris
Artemisia absinthium
Cirsium vulgare
Centaurea nigra
Cichorium intybus
Leontodon hispidus
Hieracium diaphanum
Hieracium vagum
Pilosella officinarum
Crepis capillaris
Taraxacum officinale s.l.
Allium vineale
Festuca r. rubra
Poa compressa
Poa pratensis s.s.
Bromus erectus
Helictotrichon pubescens
Arrhenatherum elatius
Aira caryophyllea

G. Meyer) is especially characteristic of railway ballast and other dry open habitats (Martin & Fraser, 1939), producing extensive, or epidemic (e.g. R87, Winchelsea) swards on the flat cinder bed of the permanent way, where it may survive chemical spraying. Several factors contribute to the abundance of both forms:

(i) Efficient vegetative spread, soon colonising nearby bared cinder and ballast.

(ii) Wind dispersal of spores to produce new populations, aided by the turbulence caused by traffic.

(iii) Tolerance of low nutrient levels and ability to compete successfully in cinder and ballast with minimal humus.

(iv) Resistance to spraying and even when suppressed, ability to recover quickly by vegetative means.

(v) Extensive rhizomes able to maintain contact with water deep in the soil.

Equisetum palustre L. often accompanies E. arvense or replaces it in similar railway habitats, particularly in South Wales. Although very common off railway land, E. arvense reaches remarkable population levels on and by lines. It is particularly well-adapted to the most rigorous conditions, and is a characteristic railway species.

4.3 Epilobium lanceolatum Seb. et Mauri

Epilobium lanceolatum is a rather local species, becoming frequent only in the south-west and south-east where it grows on dry banks, wood borders and clearings, rocks and walls. There is evidence that it may be extending its range north and east into the Midlands and East Anglia (Perring et al, 1964;

Table 4.2. From 'A Computer-mapped Flora of Warwickshire' (1971), Cadbury et al. Species with greatest frequency on railways from 6718 observations.

Equisetum arvense	94%	Leucanthemum vulgare	66%
Epilobium angustifolium	89%	Senecio squalidus	65%
Tussilago farfara	85%	Vicia hirsuta	64%
Centaurea nigra	83%	Linaria vulgaris	64%
Achillea millefolium	77%	Daucus carota	63%
Pilosella officinarum	70%	Chaenorhinum minus	62%
Convolvulus arvensis	70%	Myosotis arvensis	62%
Lathyrus pratensis	69%		

Dony, 1967; Petch & Swann, 1968; Walters, pers. comm.). This plant is the commonest of the small-flowered willowherbs on railway land in Cornwall, Devon and Avon, and it was also recorded in Gloucestershire, Wiltshire, Gwent, Glamorgan and Dyfed (Pembroke). It was not seen at all in Kent and Sussex, where it is apparently widespread. The quadrat records show it to be generally calcifuge and to prefer dry open ground with intermixed ballast or rock. The species tolerates partial shade but not chemical spraying. In Avon, it was observed frequently on bare cleared ground at the edge of scrub, and was found growing with Pteridium in heathy grassland in one Gwent locality. It spreads by using a feathered seed, a method helped by the railway traffic. This species has not normally been thought of as a railway plant, but the experience of 1978 shows that it is notably commoner on bare rocky habitats found on railways than on similar sites off railways in the same area. Moreover, it occurs here commonly where E. montanum and E. adenocaulon do not.

4.4 Linaria repens (L.) Mill.

Linaria repens occurs sparsely throughout Britain, being absent over large parts of Eastern England and very local in Scotland. Its status is doubtful and it is probably only native on shallow soils and rubble-strewn areas with little vegetation cover in southern England. It is found from Devon to Kent and north to the Thames, having centres of distribution in Dyfed and Berkshire/ Buckinghamshire. Within this putative native range, it is characteristic of chalk and occurs in arable fields, waste places, rocky ground and locally on railways and walls. It becomes almost exclusively a railway plant further north, and as such has spread to Inverness (Webster, 1978). On railway lines in the south, it may form hybrid swarms with L. vulgaris Mill. (Druce, 1897).

It was recorded particularly frequently in Dyfed during the 1978 survey where it occurred in all but two or three of the twenty sites visited whilst, elsewhere, it was only noted once, at CE118 Cholsey. In 1977, it was seen only once, at Howden near Hull. In Dyfed, it occurred mainly on the cinder and ballast margins of the permanent way, but has spread from here into rough grassland where, in some burnt sites, it becomes an important contributer to the overall cover. Other habitats noticed were scree of shale, limestone rock cuttings and broken tarmac, and, within this county, it is almost, if not completely, confined to railway lines (May, 1967; Rees, 1955; Davis, 1970). It is probably quite resistant to spraying, being commonest within 3 m of the track, but seems intolerant of competition, preferring open dry and stoney sites. The

floras suggest that it is a calcicole, and the quadrat information generally bears out this suggestion, although it was also common on shale at pH 3.9. It is likely that the railways now provide the main habitat and support most of the population of L. repens, having enabled it to spread well beyond the dry chalklands of southern England.

4.5 Linaria supina (L.) Chazelles

Linaria supina is very much more rare than its relative and is confined as a possible native to sandy sea-shores near Par and Hayle in Cornwall (Davey, 1909). It has spread from there on to adjacent waste ground, old quarries and railway lines, where the greater part of the British population now occurs. The plant is limited as observed in Cornwall and South Devon: and is naturalised in two places in Carmarthen (Dyfed). There are records for the species as a casual in Durham, Yorkshire and Dorset, usually on sandy ballast. It is apparently intolerant of competition and spraying (S. Evans, 1978 in litt.) and the 1978 survey records are all for bare, disturbed ballast on old sidings and branch lines, still owned by BR but no longer active. This species is near its climatic limit in Cornwall and its future in Britain probably lies with conservation of railway sites where it is of interest as a particularly good examsle of an otherwise markedly southern species that has spread north on warm dry railway lines.

4.6 Chaenorhinum minus (L.) Lange.

Chaenorhinum minus is in many respects the classic railway species mentioned as such in all the floras published since 1930, in most of which ballast and cinder are stated as the main habitat. Waste ground is locally important, but the only other widespread habitat is calcareous cultivated ground. Here, it occurs in corn fields with species such as Legousia, Euphorbia exigua and Kickxia spp. Owing to improved farming practices, the small toadflax has declined markedly as a cornfield weed since 1900, and, over much of England, it is no longer found in such places. The exceptions to this trend are in Surrey (Lousley, 1976) and Wiltshire (Grose, 1957) where it is still common on cultivated ground. Personal records show it as a garden weed with Papaver and Fumaria on raw chalk soils near Cambridge, and with Avena fatua and Calcopsis speciosa as a rather tall plant in Perthshire arable fields. By and large, however, it is now a railway plant alone. In the Midlands, especially, where the absence of calcareous soils once made it rare, the small toadflax has increased its range and abundance in this century (Edees, 1972; Howitt & Howitt, 1963; Horwood &

Gainsborough, 1933). Chaenorhinum prefers a dry base-rich soil which is kept disturbed and open and is probably a colonist in most sites in the UK, occurring on fine limestone scree in Europe (Oberdorfer, 1970). It is now common throughout Britain except in the north and in some areas where the soil is predominantly acid. The largest populations occur on finer ballast and cinder with a high base status and low humus levels, particularly on old sidings and in yards where spraying is infrequent (Wade, 1970). The calcicole weeds that accompany it in corn fields are all very rare on railways and this fact may indicate that either the dryness and stony nature of the ballast or its toxicity favour Chaenorhinum. The species also occurs on railway cinders in North America (Fernald, 1950) and Scandinavia (Hulten, 1950) in neither of which is it native, and this is also a major habitat now in the rest of Europe (Tutin et al, 1972; Oberdorfer, 1970).

4.7 Senecio squalidus L.

The spread of Senecio squalidus by railways from Oxford is well documented (Kent, 1956, 1959, 1964; Dony, 1953; Druce, 1886). The species prefers open coarse ballast, rocks and walls and is now no commoner in many areas on railways than elsewhere, having become a ubiquitous weed. Though railways may have enabled the plant to spread, the advent of spraying has meant a decline on railway land except on old sidings and yards, where it occurs on the coarser soils (the fine cinder on which Chaenorhinum grows is more especially the habitat of S. viscosus). Thus, though associated with the railways in the minds of all naturalists, it is now only very locally a significant part of the track-side vegetation. Its real population explosion in Britain was connected with the Blitz and postwar re-development, creating rubble-strewn waste ground and walls which provided more suitable habitat than railway land.

4.8 Vulpia spp. (V. bromoides (L.) S.F. Gray and V. myuros (L.) C. Gmel.)

Although much of British Rail land is covered in grassland, the only grass species which the floras consistently refer to as railway plants are Vulpia brompides, V. myuros and Catapodium rigidum. Both the Vulpia spp. are typically plants of dry (and usually rather bare), sandy and gravelly soils. V. bromoides is definitely native and a common component of open heath vegetation and dry pastures. It also occurs frequently on walls, gravel pits and (occasionally) on waste ground and is commonly associated with Aira spp. (Oberdorfer, 1970). Where this type of sandy grassland occurs on railway cuttings, it is a common plant in the semi-natural vegetation, being found throughout Britain.

V. myuros is probably an introduction and rarely if ever occurs amongst natural vegetation on heaths, being more characteristic of waste ground, wall tops and railways. It is a less common plant than its relative, but is more typical of railway vegetation, where it is often co-dominant with Poa angustifolia or V. bromoides on cinder flats and old sidings. Only rarely, as in Durham (Graham et al, 1972), is V. bromoides the commoner species on railway land. V. myuros grows in a wide variety of habitats in south-eastern England where it may be native, but, elsewhere, it is mainly a railway and wall alien. The 1978 survey showed it to be common in Cornwall, Devon and South Wales on railway lines, though the floras state that it is rare or local in these areas.

Both species gain from the provision of large expanses of coarse, dry soil with low humus content and high temperatures by the railways. The other native Vulpia spp. occur on sand dunes and with occasional alien species, as wool adventives and casuals. All are intolerant of spray and competition, but demonstrate an ability to withstand drought and soil toxicity.

4.9 Some preliminary conclusions

Comparison of the distribution of these railway species with work on chalk annuals and biennials (Grubb, 1976) shows that the railway plants represent all his groups, with a majority occurring in Group B - those found on active ant-hills, and rarely on mole-hills or rabbit scratchings. This group includes Vulpia bromoides and other characteristic railway species (e.g. Arabidopsis, Erophila, Catapodium and Arenaria serpyllifolia s.l.) which are naturally found on cliffs and sand-dunes. They seem able to colonise and persist in open habitats where the soil is light in texture e.g. sand (or cinder?). They are normally annual (e.g. Chaenorhinum, Vulpia spp. and Senecio squalidus) and are resistant to drought, though this resistance is occasionally achieved by the strategy of maturation prior to the height of the drought. All of them tend to require after-ripening which helps halt germination during the intense drought period. They seem to prefer excessive drainage and warm soils and there is probably some relationship between the vegetation of sand-dunes, ant-hills and cinder-flats. It is interesting that the Oxford ragwort is typically a cliff plant in its native localities and now has colonised substitute cliffs in the form of rubble and old walls.

Grubb's groups A and C also contain many common railway plants, though they tend to inhabit subtly different parts of the trackside vegetation. Group A has

species such as Erigeron acer (regarded as a characteristic railway plant in Scandinavia (Niemi, 1969)) and Picris hieracioides, both appreciably more abundant than usual on railway land. They normally grow now in small gaps in continuous chalk grassland and are typical of basic grassland on the edges of woodland and cliffs, or marshes and fens. Locally, they grow on more stable sand-dunes. These species keep re-colonising small gaps in the grassland and presumably perform this recolonization as readily on a railway cutting or embankment. They are species of rough railway grassland, and are significantly better represented in the quadrats as a group than those in group B.

Group C has several characteristic railway species, notably the two native Reseda spp. and both Linaria vulgaris and Hypericum perforatum. Epilobium lanceolatum and (probably) Linaria repens belong here. On chalk downs, these species occur in wayside sites, where scrub has been cleared or near rabbit burrows. The native habitats listed are woodland clearings (still a typical habitat for Epilobium lanceolatum) and also cliffs and scree (where both were found by railways in 1978). As a group, they often have a large seed output or have mobile seeds, and are thus able to establish themselves in transient, bare areas caused by disturbance. Such colonization may also be achieved by seeds with a long dormancy. Most are biennial, but some perennials are included, being generally taller and more deep-rooted than other railway plants, properties favouring successful competition for light and nutrients. These plants are also rather more common on the grassy railway banks and are favoured by occasional scrub clearance and ballast dumping. They are not so strictly cinder-flat species and grow in a wide variety of disturbed railway habitats.

The remaining selected species are less easy to interpret. Linaria supina may fit into group B as a sand-dune plant, but the horsetail is so catholic a plant that specific reasons for its abundance on railway lines, other than those listed, are hard to find.

It would, therefore, appear that those species for which railways are the main or a major habitat generally require free-draining, open positions and are more characteristic of dunes and cliffs. The unique nature of these railway habitats is shown by the ability of maritime plants such as Cochlearia danica and Cerastium diffusum to spread inland on these artificial shingle banks, sea-cliffs and sand-flats.

SECTION 5 ANIMAL RECORDING

Drawn freely from the report by A. Marsden (1978)

As during 1977, animal information collected included habitat assessment and species recording.

5.1 Habitat appraisal

Information noted in the "Habitat Appraisal" section of the Animal Records (Appendix 4) gives a semi-quantitative, but subjective, assessment of the value of British Rail property to animals. Reproduction (r), feeding (f) and living habitat (lh) were visually judged and given suitability scores ranging from 0 (bad) to 3 (good).

This information was collected at all sites visited, and has been examined with respect to the kinds of formation occurring within the sites. Cuttings, defined by a positive slope of >1m wide, and often including lesser flats, banks and ditches, occurred at 48% of the sites, whilst embankments, having a negative slope on both sides of the track with a width >1m, were found at a further 45%. The contribution of other kinds of formation, including flats and ditches, was considered too small and possibly too heterogeneous, to warrant independent analysis.

Tables 5.1 and 5.2 show the results, respectively, for cuttings and embankments. The percentage frequencies were determined by:

$$\frac{\text{Sum scored for a category}}{\text{Total sum scored for that category}} \times 100$$

Table 5.1. Cuttings. Records for 82 sites (1978).

Row No.	Animal Type	Habitat Suitability Frequencies % r	f	lh	Row Totals
1	Birds	50	48	91	63
2	Rabbits	35	30	30	65
3	Small mammals	44	44	44	78
4	Large mammals	9	10	10	10
5	Lepidoptera	57	53	54	55
6	Other insects	62	61	61	61
7	Other invertebrates	59	61	60	61
Column Totals		45	44	50	56

Linear regression analyses for total animal habitat suitability indicate that neither kind of railway formation is preferred for reproduction (the correlation coefficient, r , = .994 does not depart significantly from similarity, =1), feeding (r = .964) or living (r = .702). The only deviation of interest from this pattern is the apparent preference shown by birds for cuttings as a living habitat. However, observation of species frequencies (5.2) do not support this concept and more sightings were made on embankments than cuttings.

There are inherent difficulties in this kind of subjective recording, increased by the limitation of making observations at each site only once. The value of continuing such work is in some doubt unless a more objective method can be found.

Table 5.2. Embankments. Records for 78 sites (1978).

Row No.	Animal Type	Habitat Suitability Frequencies % r	f	lh	Row Totals
1	Birds	55	54	49	53
2	Rabbits	30	19	20	23
3	Small mammals	40	40	40	40
4	Large mammals	11	9	9	10
5	Lepidoptera	54	47	46	49
6	Other insects	63	62	62	63
7	Other invertebrates	61	61	61	61
Column Totals		45	42	41	43

5.2 Species recording

Within the constraints of the survey (Section 1.6) observations of animals belonging to the seven groups listed in Tables 5.1 and 5.2 were recorded.

Weather conditions were important in determining the activity of animals and hence the likelihood of observation. Insects, other invertebrates, reptiles and amphibians are all temperature-dependant and their abundance at suitable sites was found to vary. Generally speaking fewer species were recorded on cool, wet days. Birds and mammals, although affected by weather, are more independent and the results are therefore more likely to be constant.

A. Birds

Table 5.3. Number of species recorded during surveys 1977-78.

	1977	1978
Total species on BR	52	58
Other species associated	8	9
Other species not associated	-	8
Total species on survey	60	75

A list of species additional to those recorded in Eastern Region (Way et al, 1978) is given in Table 5.4.

Table 5.4. Birds recorded on Southern and Western Region in addition to those seen on Eastern region.

B.T.O. Code no.	Common name	Scientific name
1130	Sparrow hawk	Accipiter nisus
1150	Buzzard	Buteo buteo
3410	Greater Spotted Woodpecker	Dendrocopos major
4020	Nightingale	Luscinia megarhynchos
4090	Whinchat	Saxicola rubetra
4100	Stonechat	Saxicola torquata
5370	Linnet	Acanthis cannabina
Additional birds associated with or observed from Southern and Western Region.		
0390	Grey Heron	Ardea cinerea
0570	Mute Swan	Cygnus olor
0870	Tufted Duck	Aythya fuligula
0710	Shelduck	Tadorna tadorna
1820	Oystercatcher	Haematopus ostralegus
1850	Lapwing	Vanellus vanellus
2020	Curlew	Numenius arquata
2570	Lesser Black-backed Gull	Larus fuscus
3140	Tawny owl	Strix aluco
3670	Raven	Corvus corax
4460	Reed warbler	Acrocephalus scirpaceus
5050	Grey wagtail	Motacilla cinerea
Birds seen on Eastern Region only.		
	Sand martin	Riparia riparia
	Willow tit	Parus montanus
	Garden warbler	Sylvia borin
	Partridge	Perdix perdix

All seventy-five species of bird, recorded on or about Southern and Western Regions were, with the exception of the sparrow hawk, common for the area surveyed.

Order : FALCONIFORMES

Accipitridae (Buzzard and Hawk)

Buzzards were seen hunting on occasions above the area in general, but most likely quartered BR property for rabbits and other animals.

Sparrowhawks were less frequent and only recorded at two sites, Yarnbrook and Chessley Hill, both in Wiltshire which is at the edge of the main breeding area. The latter site was close to habitation.

Falconidae (Falcons)

Kestrels were surprisingly rare, which is unlike the situation at roadside verges where they may regularly be seen hunting. This rarity may be due to the extensive scrub on BR which is not a suitable hunting habitat.

Order : GALLIFORMES

Phasianidae (game birds)

Rough grass verges could have provided nesting for the partridge, but no evidence was found (except during 1977) and only redlegged partridges were observed.

Order : COLUMBIFORMES

Columbidae (doves)

Woodpigeons use BR for temporary roosting. Turtle doves were reasonably common and the distribution has been found to correspond closely to the main food plant Fumaria officinalis, which occurs on BR property. Collared doves were widely distributed.

Order : CUCULIFORMES

Cuculidae (Cuckoo)

The cuckoo was recorded occasionally on BR.

Order : APODIFORMES

Apodidae (swift).

Seen throughout hunting over BR, but only recorded in the "air space" occasionally.

Order : PICIFORMES

Picidae (woodpeckers)

Green woodpeckers were recorded regularly on BR and found feeding, probably on wood ant (Formica rufa). Greater spotted woodpeckers were less frequent.

Order : PASSERIFORMES

Alaudidae (larks)

The skylark was not recorded on BR very often, although the habitat seemed suitable.

Hirundinidae (swallows and martins)

Both swallows and, to a lesser extent house martins, benefited from railway structures as nesting habitats.

Corvidae (crows)

Rooks, carrion crows, jackdaws and magpies were all common railway birds found mainly feeding on carrion from the track and cess. Jays occurred more often in wooded areas.

Paridae (tits)

Great and blue tits were very common. Long-tailed tits were also frequently recorded with a nest being found at R57 Bradford Peverell, Dorset containing young. Much suitable nesting and feeding habitat was seen. Marsh tits were recorded on occasions, but neither willow nor coal tits, as the habitat was generally unsuitable.

Sittinae (nuthatch)

The nuthatch was only recorded at R69 Camel River, Cornwall.

Certhiidae (tree creeper)

Treecreepers are very common throughout BR.

Muscicapidae (thrushes and warblers)

Mistle and song thrush were occasionally recorded and blackbird were very common.

A fieldfare was recorded at E65 Greenslade, Devon being well out of its season, but unlikely to have been breeding.

Stonechats were rare, being recorded only at E77 Beaulieu Road Station, Hants on a bracken covered embankment. In a similar habitat, a whinchat was recorded at R92 Machen, Mid Glamorgan. Both were within their distributions.

Nightingales were rare, being recorded at only one site. Robins were common, having much suitable habitat. Sedgewarblers were confined to ditches and blackcaps were occasionally observed.

Whitethroats were found to be less common than in Eastern region (1977). Lesser whitethroats were not recorded.

Willow warblers were common (most abundant warbler) and chiffchaffs were recorded where woodland occurred.

Goldcrest were more occasional and mainly associated with conifers.

Prunellidae (dunnock)
Dunnocks were sometimes seen perched on the boundary fence calling. They were not abundant.

Motacillidae (pipits and wagtails)
Meadow pipits were not common, and neither were pied and yellow wagtails as the habitat was unsuitable.

Sturnidae (starling)
Startlings were widely distributed.

Fringillidae (finches)
Greenfinches, goldfinches and linnets were regularly observed, and bullfinches were common and always seen in pairs.

Chaffinches were extremely common, taking advantage of many habitat types.

Emberizidae (buntings)
Yellowhammers are well suited to a railway habitat of open scrub. Corn buntings, on the other hand, were more frequently seen on adjacent farmland. Reedbuntings were quite common (especially in 1977) and mainly seen in sites with running ditches.

Ploceidae (sparrows)
House sparrows were widely distributed. Tree sparrows were rare, being woodland species, but a nest was found in open country at C119 Evenlode, Gloucs, in a woodpecker hole.

B. Other Vertebrates
Twelve species of vertebrates other than birds were recorded on British Rail property:-

Class : MAMMALIA
Rabbit (Oryctolagus cuniculus)
Rabbits were recorded at 61/171 sites (36%).

Management of rabbit populations is often necessary since damage is caused to neighbouring farmland. Control is achieved in a number of ways and often first involves the clearance of scrub cover. However, rabbits do play a part in increasing the conservation value of BR by grazing which results in herb-rich swards.

Fox (Vulpes vulpes)
Foxes were recorded at only 8/171 sites (5%) although this number is likely to be an underestimate.

Stoat and weasel (Mastela erminea and M. nivalis)
Occasionally recorded. Stoats and weasels were probably more frequent than the results indicate as the railway habitat seems quite suitable.

Shrew and Bank Vole (Sorex sp. and Clethrionomys glareolus respectively)
Records were made for 8/171 (5%) and 2/171 (1%) of sites respectively.

Class : REPTILLIA
Common Lizard (Lacerta vivipara)
Recorded at 15/171 sites (9%), being the second most common animal. They were usually observed running on pieces of wood or concrete or on bare rock. Much of BR property seemed suitable, especially where cuttings with loose rock provide crevices for cover.

Slow worm (Anguis fragilis)
Recorded at two sites.

Grass Snake (Natrix n. helvetica)
Recorded at two sites but probably more common.

Class : AMPHIBIA
Frog and Toad (Rana temporaria and Bufo bufo respectively)
Each recorded at <1% of sites and probably of minor importance except where ditches are well maintained.

Super class : PISCES
Three Spined Stickleback (Gasterosteus aculeatus)
Observed in an open ditch at one site.

C. Insects and other invertebrates

Sixty five species of insects were recorded and are given in Table 5.5, Table 5.6 lists the other invertebrates seen.

The species recorded tend to be those most readily recognised, although particular attention was paid to the identification of butterflies, for some species of which British Rail provides an excellent habitat.

Table 5.5. Species list of insects. Recorded on BR property during 1978 survey.

Order	Common Name	Scientific Name
LEPIDOPTERA (Rhopalocera)	Large white	Pieris brassicae
	Small white	Pieris rapae
	Green veined white	Pieris napi
	Orange tip	Anthocharis cardamines
	Brimstone	Gonepteryx rhani
	Peacock	Inachis io
	Small tortoiseshell	Aglais urticae
	Comma	Polygonia c-album
	Pearl bordered fritillary	Boloria euphrozyne
	Marbled white	Melanargia galathea
	Grayling	Hipparchia semele
	Meadow brown	Maniola jurtina
	Ringlet	Aphantopus hyperantus
	Gatekeeper	Pyronia tithonus
	Small heath	Coenonympha pamphilus
	Speckled wood	Pararge aegeria
	Wall brown	Lasiommata megera

Table 5.5 continued.

Order	Common Name	Scientific Name
(Rhopalocera) continued	Small copper	Lycaena phlaeas
	Common blue	Polyommatus icarus
	Grizzled skipper	Pyrgus malvae
	Small skipper	Thymelicus sylvestris
	Large skipper	Ochlodes venata
(Heterocera)	Buff Tip	Phalera bucephala
	Cinnabar	Callimorpha jacobaeae
	Mottled umber	Erannis defoliaria
	Plume	Pterophorus protadactylus
	Six Spot Burnet	Zygaena filipendulae
	Tiger sp.	Arctiidae
	Yellow underwing	Noctua pronuba
COLEOPTERA	Bloody nose beetle	Timarcha tenebricosa
	Dung beetle	Scarabaeoidea
	Soldier beetle	Cantharidae
	Whirligig beetle	Gyrinidae
	7 spot ladybird	Coccinellia 7 punctata
	2 spot ladybird	Coccinellidae
HYMENOPTERA	Ant sp.	Formicidae : Lasius sp.
	Ant, wood	Formica sp.
	Bee sp.	Apidae
	Bee, honey	Apis mellifera
	Bee, bufftailed	Bombus sp./Psithyrus sp.
	Sawfly gall	Pontania sp.
	Wasp sp.	Vespidae
	Wasp, parasitic	Chrysis sp.
	Wasp, oak apple gall	Biorhiza pallida
	Wasp, oak marble gall	Andricus sp.
	Wasp, robin pin cushion gall	Diplolepis rosae
	Wasp, spangle gall	Neuroterus sp.
ORTHOPTERA	Grasshopper spp.	Acrididae
	Bush-cricket sp.	Tettigoniidae
DIPTERA inc.	Biting "Gnat" midge	Ceratopogonidae
	Blow fly	Calliphoridae
	Crane fly	Tipula sp. Tipulidae
	Horse fly	Tabanidae
	Hover fly	Syrphidae
	Mosquito	Culicidae
HEMIPTERA	Frog hopper spp.	Cercopidae
	Frog hopper	Cercopis vulnerata
	Plant hopper sp.	Jassidae
	Pond skater sp.	Gerridae
ODONATA	Dragonfly spp.	Anisoptera
	Dragonfly	Cordulegaster boltonii
	Dragonfly	Aeshna grandis
	Damsel fly	Zygoptera inc. Agrion sp.

Table 5.5 continued.

Order	Common Name	Scientific Name
NEUROPTERA	Lacewing (green) Lacewing (blue)	
MECOPTERA	Scorpion-fly	Panorpa sp.
PLECOPTERA	Stone fly	

Table 5.6. Species list of other invertebrates. Recorded on BR property during 1978 survey.

Class	Common Name	Scientific Name
ARACHNIDA	Spider spp. Red spider mite	Araneida Acari
CHILOPODA	Centipede sp.	
DIPLOPODA	Millipede sp. Millipede, pill	 Glomeris marginata
CRUSTACEA	Freshwater shrimp Woodlice	Gammarus sp. Isopoda
OLIGOCHAETA	Earth worm	
GASTROPODA	Snails and Slugs	Stylommatophora
PLATYHELMINTHES	Flatworms	Tricladida

5.3 Casualties

Records were kept of casualties, amongst which were a preponderance of rabbits, game birds, rooks and crows. A "black-spot" apparently exists for badgers at Godmersham (R88) where electrocution, following contact with the third rail, has frequently been reported. Nine such cases are known to have occurred within the previous nine months.

SECTION 6 DISCUSSION AND PROPOSED WORK

6.1 Amalgamation of the objective surveys

The continual assessment of recording and handling techniques has led to a number of modifications which should improve the quality of information and interpretation. It is possible that the sampling efficiency may be improved in a comparable way.

At present, the project sustains three statistically independent surveys, namely the random, the cutting/embankment and the Biological Interest surveys. Whilst ways of relating the Biological Interest survey to components of the objective survey have been suggested (Section 3), the data remain strictly incompatible as, inter alia, is the information collected in the random and cutting/embankment surveys.

With this diversification of resources, the sampling efficiency is low, only one part in 700 (100 m in 77 km of running track) being investigated. The intensity could be doubled within the available resource by combining the random and cutting/embankment surveys (the independent value of the Biological Interest survey to the Nature Conservancy Council is recognised) and it would become feasible to stratify a survey of this increased size. However, it is first necessary to consider whether the information obtained from independently sampling cuttings and embankments is sufficiently specific or important to outweigh any advantage gained by amalgamation.

An inspection of the random site data for 1977 and 1978 shows that, of the 120 sites visited, 39 were cuttings, 43 embankments, 11 flats, and the remainder were variously combined, but not dominated by any particular type of formation. Records of aspect and slope are kept, and it would be possible to obtain much of the kind of information now available in the cutting/embankment survey by post-hoc inspection of combined stratified data. The main inadequacy relates to the theory behind pairing of sites. Pairing was introduced because, ideally the embankments should comprise materials removed from adjacent cuttings (Way & Sheail, 1977). However, since no method has been used to establish this assumption, no relevance can be placed on any dependent interpretation, and any contribution to the project is necessarily minimal and possibly destructive.

It is therefore proposed to combine and stratify the objective surveys, the stratification being in such a form as to enable post-hoc inclusion of random sites already visited in Eastern, Southern and Western regions.

6.2 Stratification of the combined objective survey

Inspection of the accumulated data indicates that three factors make a particularly important contribution to variation in track-side vegetation. These are pH, drainage and management, and should be used optimally to produce a sampling stratification. However, information of the extent and scale required is not available and it has been found necessary to approximate the factors.

The method chosen to do this follows Bunce, Morrel and Stel (1975) and involves recording and processing a number of mapped attributes for each unit to be sampled. The method is eclectic and combines selected meteorological, edaphic and vegetational characteristics, with available information concerning track type and usage. It is expected, after processing, to derive a number of groups from the recorded attributes which will segregate variability into stratifiable "track classes". These classes will be primarily utilitarian, although, with careful choice of characters, major vegetation gradients (dependent on pH, drainage and management) should be reflected.

The length of British Rail track in use in 1975 was 11,289 miles (Way, Sheail & Mountford, 1977) and it is proposed to sample the track in units of ten miles. This sampling intensity will result in some 1,120 sites, of which rather less than one quarter are likely to be urban. After location, urban sites will be excluded from the survey, although the total number will be recorded to approximate the length of existing urban track. Rural track units (except terminally where lengths of less than five miles may occur and will be ignored) will be scored for the following attributes:

(Table 6.1 over page)

Table 6.1. Stratification attributes.

Meteorology. Rainfall and temperature range. 6 classes will be taken from the Climatic Atlas of Europe (UNESCO, 1970).

Geology, solid. 18 classes will be recorded from the Geological Map of Great Britain (Geological Survey, 1957).

Geology, drift. 12 classes, listed in the Atlas of Great Britain and Northern Ireland (Oxford, 1963) will be used.

Soils. Combined and reduced data giving rise to 13 classes will be taken from the Soil Map of England and Wales (Soil Survey, 1975) and the Atlas of Great Britain and Northern Ireland.

Topography. 7 classes weighted toward the lower end of the scale where the majority of railway lines occur will be used. Source: Atlas of Great Britain and Northern Ireland.

Vegetation. Coarse vegetation types (i.e. marsh, coniferous woodland) recorded on O.S. 1" to 1 mile maps and abutting onto the railway track will be scored.

Track type. Gauge and number of tracks together with information on usage (i.e. electrification, high speed track) - 7 classes.

Using the recorded attributes, rural track units will be classified by some suitable multivariate technique. Initially, it is proposed to use Indicator Species Analysis for this purpose and to take the data to five levels of division. This classification will give rise to 32 (2^5) "track classes". The track classes will cover the entire country and it is likely that the first division will separate track in the upland north and west from that occurring in the south.

For survey purposes, British Rail has been divided into four areas which coincide with Eastern, Scottish, London-Midland and combined Southern and Western regions (Way & Shenil, 1976). Of these, field sampling has already been carried out in Eastern (1977, interim report) and Southern and Western (this report) regions. It is not expected that all 32 track classes will occur in each of the areas under consideration, but a certain number of track classes will be present in each region. Projected field sampling will be related to the frequency of class occurrence and a minimum of two sites for each stratum in each area will be sampled. In areas where field sampling has already been carried out, the stratification will necessarily be post-hoc, and, whilst each sample will be ascribed, by location, to a stratum, it is unlikely that

the coverage will be proportional. It is possible that some correction may be made by over-sampling of previously under-represented classes, providing these occur with sufficient frequency in the areas yet to be surveyed. However, it is unrealistic to expect that a perfect stratification can be achieved.

The size of the field sample in previous years has been a stretch of track (fenced British Rail property) 100 metres long. This is a conveniently surveyed area which, for logistic and comparative purposes, should not be altered. The minimum practical length for the track class unit is ten miles and any further reduction would increase the number of samples (900 at this length) to a level beyond the ability of the present resource. The lengths are clearly not compatible and since it is not sensible to extend the sites or shorten the track unit it will be necessary to introduce a two-tiered sampling system, i.e. effectively, to sample the sample.

This sub-sampling will be done by:

a) determining the proportion of the total sites to be examined in each track class in the area under consideration;

b) numbering all members of that stratum, and randomly selecting the required proportion, which will give the track class units to be sampled;

c) repeating the procedure within each track class unit by numbering and randomly selecting access points (bridges, level crossings, etc.).

d) These access points will locate, as in previous years, the sample site.

e) Sampling and assessment will be as described in Section 2.

The post-hoc relation of all kinds of previously recorded site will be by their occurrence within a particular ten-mile unit, each of which is referable to a track class.

Work on the stratification is already in progress, and will be completed in time to select sites on the London Midland region for survey during 1979.

6.3 General conclusions

The emphasis laid on refinement of method during this years report should enable a greater freedom to discuss the biological and conservation aspects of the railway system in future. Whilst it is clearly sensible to replace the current random and cutting/embankment surveys with a stratified random sampling system, and to analyse site data in conjunction with information derived from

stratification, no decision has yet been made as to whether quadrat analysis should continue to be based on estimated cover information. The value of cover quantification during I.S.A. has been discussed and its main contribution has been to indicate that flexibility should be maintained between mathematically (I.S.A.) defined groups of the railway vegetation continuum. Whether cover data will produce more sensitive groupings in conjunction with other multivariate techniques has yet to be tested, and cover information will therefore continue to be collected so that any future classifications will not be limited to incidence data.

It is hoped that the introduction of lichen and bryophyte recording will also improve the sensitivity of the survey, and it is likely that ballast testing will make a useful contribution to interpretation.

Whilst limitations in the techniques currently used are recognised, it should nevertheless prove possible to produce a fairly accurate description of British Rail vegetation, and to describe in some detail those areas likely to be of particular interest to the Nature Conservancy Council. How such areas are eventually managed will depend on discussion between British Rail and the Nature Conservancy Council, although some ideas have already been mentioned. It is possible that British Rail would be prepared to mark and selectively manage a limited number of sites. This procedure would certainly be sensible in the short term, but, with changing management, long-term conservation prospects might not be so promising. An alternative approach would be to identify more extensive lengths of track, broadly representative of the biological value of British Rail land, over which long-term management plans could be negotiated between British Rail and the Nature Conservancy Council.

Such a scheme (and indeed most approaches to railway land conservation) would require informed advice on the effects of different management policies on British Rail property, and it is therefore hoped, during the next few seasons, to establish selective management trials.

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APPENDIX 1

RANDOM SITES VISITED DURING 1978

APPENDIX 1. Random sites 1978.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
NCC SOUTH-EAST REGION								
a) KENT								
R88	5 June	TR 068506	Godmersham	Canterbury-Ashford	SE	Emb	10.5-12.5	Nettle and rank vegetation with regeneration of previously cleared scrub. Emb shaded and with litter from field maple.
					NW	Emb	12.5-15	Open mixed deciduous scrub over ivy. Scattered herbs and nettles.
R89	6 June	TR 234632	Grove Ferry	Canterbury-Ramsgate	N	Cut/ Emb	13.9	Sycamore scrub with some plum on cutting slope, over bramble, ivy and nettle. Also coarse (Arrhenatherum/ Holcus) grassland with ivy, bramble and nettle.
					S	Flat	14.9	Coarse grass (Arrhenatherum/Holcus), ivy, bramble and other weedy species.
R90	7 June	TR 258482	Shepherdswell	Canterbury-Dover	E	Cut	15	Steep, partially unstable, chalk cutting with scrub above and forb rich grassland on gentler slopes.
					W	Cut	10	Good calcicolous flora including Campanula medium, scrub above, exposed rock and forb rich grassland below.
R91	8 June	TR 288692	Birchington	Faversham-Margate	N	Flat	4.6	Coarse (Arrhenatherum/Agropyron) grassland, with rank weeds and some escapes from adjacent suburban gardens.
					S	Flat	4.3	Coarse grassland.
R107	10 July	TQ 694736	Shorne	Gravesend-Chatham	N	Flat	0.8-22.4	Mainly rough Arrhenatherum grassland with frequent scrub-broom, Acer and blackthorn. Herb-rich with Centaurea, Potentilla. Some Clematis. Tl very narrow ballast edge.
					S	Flat (& Emb)	c13.5	On low bank, damp flat below and ditch - tall dense reed beds with tall herbs below. Near east end, ditch shallower, bank more disturbed and nettle/dock, goosegrass common.
R108	11 July	TQ 710450	Claygate	Redhill-Ashford	N	Flat/ Cut	7.6	Low cutting with flat above. Mainly mixed rough vegetation of bramble and coarse grasses becomes mainly bramble near the fence, where nettle is common. Scarce low bushes.
					S	Flat/ Cut	c8.5	Similar but with broader flat. Less bramble and generally a herb-rich but species-poor coarse grassland with Arrhenatherum, Holcus, Fescue, Dactylis, Leucanthemum, Centaurea.
R109	12 July	TQ 831657	Rainham	Chatham-Canterbury	NE	Cut/ Flat	7.8-9.3	Generally coarse species-poor and herb-poor Arrhenatherum grassland with some areas dominated by Trisetum/fescue and abundant Fragaria x ananassa.
					SW	Cut/ Flat	8.8-10.9	Rather mixed and disturbed. Mainly rough grassland dominated by Trisetum/bent, Holcus lanatus or mixed grasses. Some Daucus patches; and nettle/thistle on flat.
b) SURREY								
R103	3 July	TQ 030521	Clandon	Guildford-Esher	S	Cut	15.6	Scrub with nettle stands and acid woodland flora, some bramble.
					N	Cut	12.6	Acid oak woodland and scrub with nettle stands and acid woodland flora. Bramble and honeysuckle.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
R105	5 July	TQ 286451	Salfords	Redhill-Brighton	W	Emb (+ Flat)	c15	Generally rather disturbed slope with low bramble thickets, dense privet scrub and some bigger bushes. Batches of bare ballast and tall weeds. To south end line of poplar trees with understorey low bushes and mercury.
					E	Emb (+ Flat)	c21	Large rough grassy slope with mixed coarse vegetation of Arrhenatherum and Rubus fruticosus in varying proportions. Large areas of Equisetum, briar and hogweed etc. Damp flat below with rushes, meadowsweet, etc.
c) EAST SUSSEX								
R83	31 May	TQ 486216	Uckfield	Uckfield branch	S	Flat/ Emb	9.6	Flat with coarse (Arrhenatherum) grass and some herbs. Emb with closed oak/hazel woodland. Some plum.
					N	Flat/ Emb	13.5	Flat as south. Emb with oak/hazel woodland, ash and some bare ground and ivy. Dense scrub where previously cleared.
R85	2 June	TQ 430055	Southease	Newhaven branch	E	Emb/ Ditch	6.9	Low embankment with coarse grass, horsetail and bramble. Dyke with reeds, including Sparganium.
					W	Emb/ Ditch	7.0	Low embankment with coarse grass (Arrhenatherum), horsetail, bramble and reeds in wide open-water ditch.
R86	3 June	TQ 568048	Polegate	Brighton-Eastbourne	E	Cut	15	Mosaic scrub and coarse grassland with bramble.
					W	Cut	11.2	Herb rich grassland, dense blackthorn scrub and bramble.
R87	4 June	TQ 900184	Winchelsea	Hastings-Ashford	SW	Flat	3	Narrow flat with ivy and some bramble and elder scrub, horsetail on cess.
					NE	Flat	2.8	Narrow flat with ivy and some couch. Elder scrub. Only value bird habitat.
d) WEST SUSSEX								
R82	30 May	TQ 227350	Kilnwood	Crawley-Horsham	E	Flat	4.2	Narrow flat with coarse (Arrhenatherum) grass and encroaching briar hedge.
					W	Flat	4.7	Narrow flat with coarse (Arrhenatherum) grass, some scrub and bramble.
R84	1 June	TQ 292121	Clayton	Victoria-Brighton	NW	Cut	30	Deep, inaccessible cutting with cherry, dogwood, ash and hawthorn scrub. Scree and rubble with Clematis.
					SE	Cut	30	Similar to NW but with denser scrub.
NCC SOUTH REGION								
a) BERKSHIRE								
R72	15 May	SU 424671	Marsh Benham	Reading-Westbury	SW	Emb	6.4	Low embankment with ditch. Coarse grass (Arrhenatherum) with hydrophiles especially Caltha.
					NE	Emb	7.3	Low embankment with ditch. Coarse grass, reed and willowherb.
R106	6 July	SU 828623	Sandhurst	Wokingham-Farnborough	E	Emb (& Flat)	17-23	Varied with large areas of bracken over rough acid grassland, becoming more bushy north to give closed birch with oak/hazel scrub. Ditch below with Pellia and Blechnum.
					W	Emb (& Flat)	17-21.4	Similar change; but more bramble/briar at south end with bracken mainly on flat. Scrub to north is birch/oak over open undergrowth. Flat below dominated by tall alder and Rubus.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
b) HAMPSHIRE								
R78	21 May	SU 290001	Setley	Southampton-Bournemouth	NW	Emb	13.4	Embankment with dense Rubus and some sallow and creeping willow.
					SE	Cut/ Flat	11-17	Bramble and mixed grassland with Molinia and Poa, or Juncus where wet. Mixed species-rich heath on flat above cutting with Pulmonaria longifolia.
R79	22 May	SU 267269	East Dean	Salisbury-Southampton	N	Emb	c5.5	Coarse grass (Arrhenatherum) on heavy ballast strewn embankment, with damper grass, herbs and bramble below.
					S	Emb	c5.7	Coarse grass on ballast with some scrub and bramble below.
R80	23 May	SU 771268	Liss	Guildford-Portsmouth	SE	Cut	6-8	Low cutting with coarse grass (Arrhenatherum), Rubus and Urtica.
					NW	Cut	5.5-8	Low cutting with coarse grass, bramble and nettle. Stand of Sedum telephium.
R81	24 May	SU 541072	Titchfield	Fareham-Southampton	S	Emb/ Flat	70	Large site with mixed deciduous woodland and good flora. Species-rich grassland down to R. Meon. Orobanche minor.
					N	Emb/ Flat	64	Mixed deciduous woodland, with some ground cover and Rubus where open.
R104	4 July	SU 829554	Fleet	Waterloo-Basingstoke	S	Flat/ Cut	7.5-9.8	Area of acid heathland with Deschampsia flexuosa and Erica giving way east to damp coarse grassland of Molinia/Holcus mollis up to birch lined ditch.
					N	Flat/ Emb/ Ditch	1.7-6.3	Mainly a very narrow ballast verge by the fence with little surviving vegetation: Calystegia and Heracleum. Broader area has mixed Arrhenatherum and fescue grassland, rank with willows.
c) OXFORDSHIRE								
R117	14 August	SP 525143	Islip	Oxford-Bicester	SE	Cut/ Flat	9.2-18	Hawthorn/blackthorn scrub with tall ash over an ivy carpet on the cutting. Flat below horsetail and rough grass. T2 has disturbed rough vegetation and grassland.
					NW	Cut (& Flat)	8.9-17	Cutting has bramble thickets and thorn scrub with rough grassland nearer line and on the flat at T3 where Arrhenatherum dominates with thistle etc.
R119	16 August	SU 519907	Didcot	London-Swindon	S	Cut (+ Flat)	9.5-11.2	Mainly herb- and species-poor Arrhenatherum grassland with frequent invasive low scrub of elm/blackthorn. Some very disturbed parts with bare soil and sparse grass. Richer near fence.
					N	Flat (& Cut)	9.5-70.4	Mainly open cinder flats with some earth piles. Low sparse vegetation of moss, annuals: Arenaria, Sagina, Matricaria. The low cutting has coarse Bromus/Arrhenatherum.
d) WILTSHIRE								
R73	16 May	ST 828507	Redbridgestone	Westbury-Taunton	S	Cut	90	Coarse (Arrhenatherum) grassland and Rubus with some shrubs and woodland herbs on low cutting. Mosses.
					N	Cut	10	Coarse (Arrhenatherum) grassland and Rubus with scrub, some cut and burn.
R76	19 May	ST 964296	Tisbury	Yeovil-Salisbury	N	Emb	11.8	Ballast strewn flat and emb. Much disturbed, with ivy, nettle, Rubus and coarse grass, dropping to butterbur and reed swamp.
					S	Emb	14.6	Heterogenous:calcicolous coarse grassland and scrub, also Rubus and reed bed at emb foot.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
R77	20 May	SU 174341	Winterbourne Earls	Salisbury-Basingstoke	NW	Cut/ Flat	8.1	Steep, small chalk cutting with ivy under privet, dogwood or other mixed scrub. Some coarse calcicolous grassland at flat.
					SE	Cut/ Flat	8.7	As NW but with more Rubus.
R118	15 August	SU 035816	Chessley Hill	Swindon-Bath	S	Emb (Ditch/ Flat)	24-26.5	Very varied: bramble thickets, nettle stands, crack willow shelter-belt and scrub, Equisetum telmateia stands. Galium aparine common under Salix. Flowing ditch below.
					N	Emb	22.2-23.8	Also varied: sallow scrub over tall herbs and moss, blackthorn scrub; oak/elm woodland edge; coarse Arrhenatherum or mixed grassland with bramble thickets, thistles and bare ballast.
NCC SOUTH-WEST REGION								
a) AVON								
R115	8 August	ST 674802	Westerleigh	Swindon-Bristol/ Severn Tunnel	N	Emb	34-38	Mixed deciduous woodland of ash and Quercus robur with some Q. cerris. Scrub layer denser near bottom - hazel, hawthorn, briar, Swida. Ground covered in ivy carpet with a few herbs.
					S	Emb	30-44	More varied - mainly tall scrub covered; oaks, birch, ash, sallow and hawthorn/Salix fragilis. Some oak and maple woodland. Some ivy carpets and bramble thickets. Unshaded areas with tall herb cover.
b) CORNWALL								
R67	30 April	SX 053663	Bodmin	Wadebridge branch	S	Cut	17	Deep cutting with Rhododendron scrub, bramble and rough grassland where cleared.
					N	Cut	9	Deep cutting with gorse and heather, bramble above.
R68	1 May	SW 635392	Penponds	Plymouth-Penzance	S	Emb	16	Disturbed embankment adjacent gardens. Weedy with Hedera.
					N	Emb	12	Brambles with Acer/Corylus at base of embankment.
R69	2 May	SX 088722	Camel River	Wenford Bridge branch	N	Emb	7.5	Extension of adjacent mixed deciduous woodland, with much holly on embankment.
					S	Cut	2.25	Cut coarse grass and ivy adjacent conifer woodland, no BR fence.
c) DEVON								
R65	28 April	SS 516105	Bury Moors	Meeth branch	SW	Flat	3.3	Acid grassland with woody species and much litter under oak.
					NE	Flat	2.9	Acid grassland with woody species and much litter (including Molinia) under oak.
R66	29 April	SX 640999	Fullaford Bridge	Meldon Quarry branch	NW	Flat/ Emb	17.8	Rough acid grassland and pines.
					SE	Flat/ Emb	16.1	Scrubby bank above damp grassland with rich flora. Diverse site.
R70	3 May	SX 430683	Ward House	Gunnislake branch	N	Cut	c6.5	Scrub and coarse acid grassland, with bare ground, Pteridophytes and mosses on slope.
					S	Cut	7.5-10	Steep rock cutting with Pteridophytes, coarse grassland and Hedera. Sallow and hazel encroaching.
R71	4 May	SX 709605	South Brent	Exeter-Plymouth	N	Cut/ Flat	13.6	Coarse (Arrhenatherum/fescue/Poa) grassland with bramble and gorse and mosses on exposed rock cutting. Orchids and lizard.
					S	Cut/ Flat	3.5-10	Scattered scrub and bramble with species-rich meadow grass above.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
d) DORSET								
R75	18 May	SY 659932	Bradford Peverell	Yeovil-Dorchester	NE	Emb	11.5	Deciduous scrub of willow, hawthorn and guelder rose over ivy. White willows at base. Exc. bird site, compared adjacent land.
					SW	Emb	15.5	Disused track, ballast colonised by coarse grass. Emb with coarse grass, low scrub (predominantly hawthorn) and bramble, lizards.
e) SOMERSET								
R61	24 April	ST 322327	Fordgate	Bristol-Taunton	W	Emb	6.5	Low embankment and ditch. Line above Somerset Levels. Much disturbed and species poor (Rubus-Arrhenatherum, some scrub).
					E	Emb	10.1	Low embankment and ditch. Partially burnt (Rubus-Arrhenatherum).
R62	25 April	ST 549299	Keinton Mandeville	Westbury-Taunton	NW	Emb	12	Ash/dogwood scrub with ivy and bramble, scattered patches calcicolous grassland.
					SE	Emb	13	Coarse grass and bramble with ash scrub (previously cut) and ivy.
R63	26 April	ST 418077	Hewish	Yeovil-Exeter	SE	Emb	12.4	Coarse Arrhenatherum grassland with Rubus on old ballast tippings with damper grassland by Crataegus/Cornus hedge.
					NW	Emb	10	Grassland with woodland species becoming Crataegus/Corylus scrub with much bramble and aquatics by stream at base of embankment.
R64	27 April	ST 182249	Norton Fitzwarren	Taunton-Exeter	SW	Flat	13.7	Disturbed ballast flats with ruderals and bare ground. Rubus covered embankment at margin.
					NE	Emb	7.0	Disturbed embankment with Rubus and ditch.
R74	17 May	ST 715410	Wanstrow	Cranmore branch	SW	Flat-Cut	15.6	Damp, coarse Arrhenatherum, with brome over fescue subdominant, and calcicolous or damp meadow herbs. Some scrub and bramble, twayblades.
					NE	Flat	8.3	Coarse calcicolous Arrhenatherum with Rubus and some scrub. Spraying.
NCC WEST MIDLAND REGION								
a) GLOUCESTERSHIRE								
R114	7 August	SO 878022	Blackness	Stroud-Swindon	S	Emb/Flat	3.8-13.8	Down to canalised River Frome. T1 has stream through it and damp-ground tall herb vegetation. The slope has Saponaria/rosebay or coarse grassland.
					N	Cut/Flat	6.8-9.4	Limestone retaining wall at T3 and old huts etc. and rubble at T4. Vegetation of bramble thickets, coarse Arrhenatherum grassland and open ground with weeds and moss.
R116	9 August	ST 546978	Wye Gorge	Tintern Quarry	W	Flat	2-3.4	Narrow flat on cinder with scrub encroaching from adjacent woodland. Heavily cut-back to leave many stumps, open ground cover of ivy with abundant moss and some surviving herbs etc.
					E	Cut (& Flat)	6.2-10	Including several limestone rock faces. Some mixed deciduous woodland over an ivy carpet. Open areas have gorse/hazel/Swida scrub and herb-rich limestone turf plus again an ivy carpet.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
R120	17 August	SP 222282	Evenlode	Oxford-Worcester	W	Flat (& Cut)	6.3-8	Species poor though often herb-rich mixed grassland. Near line developed on ballast and cut with Arrhenatherum/Dactylis and Convolvulus and Vicia. Further away with bent and Holcus mollis also. No shrubs.
					E	Flat/ Cut	7.8-9.9	Some scrub patches: blackthorn and a ditch at T3. Otherwise similar with Arrhenatherum/Convolvulus on ballast by line; and Holcus mollis/bent etc., further away. Again cut near the line.
b) HEREFORD AND WORCESTER								
R110	31 July	SO 929654	The Croft	Worcester-Bromsgrove	NW	Cut (& Flats)	9.2-17	Steep cutting with rough or grassy vegetation. T1 is mainly a bramble/Arrhenatherum mixture with nettle and low bushes. The west end is herb-poor Bromus/fescue turf.
					SE	Cut (& Flats)	7.2-14	Much less bramble, but like other side tall hedge at top and scattered low bushes over bank. Rest is coarse herb- and species-poor Bromus erectus grassland with fescue.
R112	2 August	SO 493639	Eye	Newport-Shrewsbury	E	Flat (& Emb)	7.4-8.5	Many bramble thickets with emergent nettle/thistle. Rough occasionally herb-rich but species-poor Arrhenatherum grassland also, with thistle, mercury, horsetail.
					W	Flat (& Emb)	c3	Mainly bramble thickets often mixed with coarse Arrhenatherum grassland, and Equisetum arvense. Scattered low scrub and areas dominated by bracken and rosebay.
R113	3 August	SO 900459	Croome Perry Wood	Bristol-Birmingham	E	Cut/ Flat	7-81	Slope cleared recently to leave mainly bare soil with cinder and ballast, some stumps and weeds left. Flat has mixed deciduous scrub of hazel, maple, ash and oak with ground cover of litter and moss.
					W	Cut/ Flat	4.6-6.4	More variable. Also cleared near line but more disturbed and recolonisation further forward with Rubus/Clematis, grasses and forbs on bare soil/cinder etc. Flat has some intact mixed scrub.
NCC SOUTH WALES REGION								
a) MID GLAMORGAN								
R92	19 June	ST 202891	Machen	Bedwas branch	S	Emb/ Flat	32	Bank with Holcus spp. and bracken, some woody, recently burnt. Old track bed with herb-rich calcicolous grassland, Epilobium lanceolatum and Anaphalis.
					N	Cut	5.9	Bracken/bent or sorrel; scattered oak and small quarry with ash/sycamore.
R99	26 June	SS 879874	Llynfi	Maesteg branch	W	Cut	13.8	Coarse grass adjacent track with bluebell/bracken and bramble on cutting above. Derelict weedy garden at T2.
					E	Flat	1.3	Narrow flat with coarse fescue grassland with bracken. Ditch with aquatics and polluted farmyard runoff.
b) SOUTH GLAMORGAN								
R100	27 June	SS 957699	Llantwit	Barry-Bridgend	S	Cut	13.9	Low cutting with species poor Bromus grassland and flanked by tall hawthorn hedge. Some bramble and briar.
					W	Cut	14	Some Bromus grassland much bramble and hawthorn scrub. Hawthorn hedge. Poor with aquatics.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
c) WEST GLAMORGAN								
R98	25 June	SS 580972	Gowerton	Swansea-Llanelli	NE	Cut/ Emb	8-11.5	Species poor fescue grassland with dense bramble on emb. Cutting with mixed willow scrub, pteridophytes and mosses on exposed rock.
					SW	Cut/ Emb	7.9	Coarse grass, bracken and bramble, previously burnt, on cutting. Embankment with bramble covered ditch, coarse grass, some scrub and much gorse.
d) GWENT								
R101	28 June	SS 310189	Llwyn-Gwyn	Newport-Hereford	W	Emb	6.8	Coarse grassland (Arrhenatherum) with horsetail, bramble and nettles. Dry ditch.
					E	Emb	8.	Coarse grassland (Arrehnatherum) with horsetail, bramble and nettles. Grazed margins at fence more varied.
R102	29 June	ST 215935	Cwm Carn	Risca-Aberbeeg	E	Flat	3	Acidic grassland (Festuca/Holcus/Arrhenatherum) much overrun with bracken. Some bramble, oak/ash scrub.
					W	Cut	2.5	Acidic grassland overrun with bracken. Some bramble, some oak saplings.
NCC DYFED-POWYS REGION								
a) DYFED								
R93	20 June	SN 049202	Deepford	Carmarthen-Fishguard	N	Cut	12	Recently cut scrub and bramble (nettle with coarse Arrhenatherum) grassland and ditch supporting much Oenanthe crocata.
					S	Emb	31.5	Horsetail, coarse (Arrhenatherum) grassland and rank weeds including nettle. Much bramble and some blackthorn.
R94	21 June	SN 119053	Saundersfoot	Tenby/Pembroke branch	S	Emb	9.6	Fescue grassland with briar and coarse herbs. Going to blackthorn, bramble and gorse scrub.
					N	Emb	8.4	Fescue grassland with encroaching scrub. Many species including Linaria repens.
R95	22 June	SN 293175	St. Clears	Carmarthen-Fishguard	S	Cut	16.9	Coarse, damp (Holcus) grassland at cutting base. Much bramble and nettle. Gorse on slope. Previously burnt.
					N	Cut	19.4	Coarse damp grassland with herbs and much bramble. Some shrubs.
R96	23 June	SN 412036	Pembrey	Llanelli-Carmarthen	W	Flat	6.1	Narrow site with dry ditch reed (Phragmites) with coarse grassland (Arrhenatherum) adjacent to line.
					E	Flat	6.4	Narrow site with dry ditch. Coarse (Arrhenatherum) grassland near line, giving way to reed (Phragmites) beds. Scrophularia scorodonia present.
R97	24 June	SN 623203	Talhardd	Llanelli-Shrewsbury	NW	Emb	4.8	Low embankment recently sprayed; ivy, bramble and pteridophytes under N.L. oak. Some coarse (Arrhenatherum) grassland and oak scrub. Linaria repens.
					SE	Emb/ Cut	10	Coarse (Arrhenatherum/Holcus) grassland with cut scrub and extensive rose bay stand.
b) POWYS								
R111	1 August	SO 154686	Dolau	Llanelli-Shrewsbury	NW	Cut/ Flat	4.7-10	Scrub on cutting of hawthorn/blackthorn over bare soil, rock and moss. On the edge and to the west, fescue/Arrhenatherum grassland. Horsetail by line.
					SE	Cut/ Flat	5.3-10	Old track bed by bank colonised by Fragaria, fescue, moss and violet. Tall grassland on flat and blackthorn scrub on cutting with rough grass patches above.

APPENDIX 2

CUTTING/EMBANKMENT SITES

APPENDIX 2. Cutting/Embankment sites 1978.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
NCC SOUTH-EAST REGION								
a) KENT								
CE87	5 June	TR 074530	Julliberrie Downs	Ashford-Canterbury	W	Cut	6.4	Mixed open calcicolous scrub with no clear dominant but including ash/maple/sallow/hornbeam/beech/hawthorn/birch etc. Extremely species rich and with great variety of herbs including many grassland species.
					E		9	Ash/maple scrub thinning out near line to bramble thicker and giving way above to taller scrub with oak and birch. Grasses and tall herbs rather common, and with areas of open calcicolous coarse grassland to south.
		TR 076520	East Stour Farm	Ashford-Canterbury	W	Emb	7.2	Patches of low dogwood scrub and taller trees. Mainly mixed rank vegetation of bramble and Arrhenatherum with Heracleum and Dactylis. Some low hawthorn bushes.
					E		6.7	More woody with hawthorn mixed deciduous scrub near line mixed with tall bramble thickets. Some coarse grassy patches. The order is often reversed and many woody species are involved e.g. apple/briar etc.
CE88	6 June	TR 189560	Bekesbourne	Canterbury-Dover	NE	Cut	23	Tall oak woodland; with scrub layer hazel near the line thinning out in the deeper shade. Hawthorn, dogwood and briar elsewhere. Field layer often dense with much nettle; Brachypodium, dock and rosebay also.
					SW		26.5	Mixed deciduous tall scrub over most of bank with nettle stand in open by line. The lower edge is oak and elm and the rest hazel/cherry/sallow with bramble in undergrowth, and field layer of fern and nettle.
					N	Emb	28.6	Mainly tall dense sycamore scrub with little or no ground cover except near bottom. Litter is the main cover. Ash is common by the line and tends to replace Acer in a zone half-way down. Nettle etc. grow near bottom.
					S		28	Mainly ash/oak woodland with scrub layer of elder and hawthorn, and ground cover of ivy. Nettle occasional and considerable bare soil near top-of slope. Nearer the line are areas of coarse Arrhenatherum with nettle.
CE89	7 June	TR 254491	Stafflands	Canterbury-Dover	E	Cut	3.2	Dense species-poor Brachypodium pinnatum grassland with some areas of Arrhenatherum, and much low thorn scrub in the north. Leucanthemum is frequent emergent from the litter and there are several ant-hills.
					W		4.8	Disturbed and scrubby. Lower bank briar/Bryonia/Tamus thicket with bare soil, ballast and moss below it. There are some emergent weeds and coarse grasses here where the scrub has been cut. The scrub left above is hazel/Swida.
					E	Emb	10	High oak woodland with sycamore of varying height contributing to tree, understorey and scrub layer, where it grows with hazel and Viburnum lantana. Field layer almost continuous mercury and much ballast in soil.
					W		10	Mixed vegetation including dense low dogwood with much Clematis/Rubus/bindweed/briar clambering over, and spreading over slope to give intertwined thicket with emergent nettle, bittersweet and Arrhenatherum. Some tall trees.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
CE90	8 June	TR 221680	Brook Bridge	Faversham-Margate	S	Cut	12.7	Mainly tall herb-poor Arrhenatherum grassland with fescue and cocksfoot locally sub-dominant. On lower slopes there are some dense bramble patches and a few scattered hawthorn bushes generally.
					N		5.8	Herb and species-poor Arrhenatherum grassland with some Rumex acetosa. Nearer line bramble and fescue become co-dominant to produce a rough mixed vegetation.
					S	Emb	7.2	Upper slope tall herb-rich but species-poor Arrhenatherum grassland. Abundant Leucanthemum and several other herbs. Lower slope nettle-dominated vegetation with reed, hogweed and Arrhenatherum scattered through.
					N		9.2	Tall herb-poor Arrhenatherum grassland with thistle and bindweed. Scattered scrub e.g. apple and hawthorn with ivy patches often dominant in their shade. Nettle occurs on upper slope.
CE107	11 July	TQ 685502	Yalding	Maidstone-Paddock Wood	E	Cut	8.6	Varied site with mixed deciduous scrub of oak, hawthorn and briar covering most of site. Nearer line, grassland zone of variable width - Holcus lanatus/Arrhenatherum. Some taller oak trees to the north. Abundant Glechoma, Viola, moss.
					W		7.6	Generally similar but more woody with patches covered in dense briar/hawthorn scrub with tall emergent oak and ash. Some areas of bramble thicket and grassland with Brachypodium sylvaticum and Poterium.
					E	Emb	1.5	Low bank over broad flat recently bulldozed to clear vegetation. The bank itself has low mixed deciduous scrub of maple, dogwood and hawthorn. Some patches of rough Arrhenatherum, bramble patches and mercury stands.
					W		2.8	Mainly scrubby slope with thorn scrub over most of area. Extensive bramble patches and abundant nettle especially below. Locally also, Humulus, as dominant in low thicket over mercury and Equisetum arvense.
CE108	12 July	TQ 831657	Rainham	Chatham-Canterbury	NE	Cut	5.6	Coarse herb-poor Arrhenatherum grassland, burnt in recent past and with woody growth almost absent. Some herbs quite frequent - Hypericum etc.
					SW		7.0	Herb-rich mixed grassland with Trisetum, fescue, Agrostis stolonifera and Holcus lanatus below, the latter commonest above. Daucus abundant with Plantago, Fragaria, Calystegia.
					NE	Emb	14	Mainly coarse herb-rich but species-poor grassland dominated by Arrhenatherum with locally Urtica patches replacing it. Hogweed, thistle and Holcus lanatus common. Much litter and no shrubs.
					SW		9.6	Probably originally like the north side but now largely overgrown with bramble thickets. Some Arrhenatherum still survives in patches or co-dominant. Couch, cleavers, hogweed and Silene.
CE109	13 July	TQ 755749	Cooling	Isle of Grain	S	Cut	2	Low bank with mosaic of medium to tall bramble thickets and coarse herb- and species-poor Arrhenatherum grassland. Some dewberry among the bramble and moss amongst the litter carpet.
					N		1.6	Coarse herb-poor Arrhenatherum grassland with frequent low hawthorn bushes. Grassland rather open and with less litter than usual, seedlings colonising bare soil resultant. Leucanthemum/Convolvulus common.
					S	Emb	11.6	Mainly coarse herb-poor grassland of Arrhenatherum and Bromus erectus with scattered low bushes of oak and briar above; and merging into nettle bed near bottom with dewberry and cleavers. Senecio jacobea.
					N		14.2	Coarse unmanaged vegetation of nettle and bramble over ground cover of abundant moss, and litter. Elm, bushes scattered through with elder. Cleavers and Glechoma abundant, with thistle and Poa trivialis.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
b) SURREY								
CE104	5 July	TQ 286494	Earlswood	Redhill-Tonbridge	S	Cut	8.4	Open hazel coppice with briar under tall birch and oak trees. Undergrowth of bramble and ferns, with field layer of mercury, tall herbs e.g. nettle. Rather open ivy carpet on ground with some moss.
					N		9	Mainly scrub-covered with ash, elder, hawthorn and a large standing dead elm patch. Undergrowth of bramble/briar. Ground cover of ivy and mercury. The edge by the line is open and dominated by tall Pteridium.
					S	Emb	22	Tall woodland of Prunus avium with oak and ash over scrub layer of hazel and young cherry. Undergrowth of open bramble and Tamus. Ivy carpet on ground near line. Further down slope: Glechoma and mercury with litter.
					N		12.5	Mainly dense, mixed, many-levelled deciduous scrub with sycamore, oak, ash, willow, hawthorn and hazel. Ground cover rich with a variety of herbs and moss, but sparse. Near the bottom opens out to give a tall nettle patch.
CE106	7 July	SU 988541	Worplesdon	Guildford-Woking	E	Cut	6.2	Fairly recently burnt. Medium height dense Pteridium with much bare soil and litter below. Large patches of Holcus mollis/Agrostis tenuis grassland with Teucrium common and low bramble/oak occasional.
					W		5	Large areas covered in dense high bracken with dead birch/oak etc. remaining from fire. Some areas disturbed with bare ground and Holcus lanatus, plus Teucrium. There is some shade from nearby oaks.
					E	Emb	3.2	Mixed coarse vegetation with nettle patches, low bramble thickets and coarse grassland of fescue/Arrhenatherum/Holcus lanatus with many tall herbs e.g. Leucanthemum/Centaurea nigra. Low bushes.
					W		3.2	Similar to east side in general form but with more bramble and low bushes. Dactylis and Agropyron help diversify the grassland. Convolvulus and Equisetum arvense are common with ragwort etc.
c) EAST SUSSEX								
CE82	31 May	TQ 496233	Buxted	Uckfield branch	W	Cut	12.7	Varied: much low open Rubus with Arrhenatherum, cocksfoot and tall herbs scattered through, plus low bushes. Some areas of herb rich grassland with Genista tinctoria; briar scrub and woodland edge.
					E		7.7	Generally more woody with dense bramble thickets, and closed scrub especially at northern end. Some herb-rich grassland similar to west side, and some coarse vegetation of bramble, hawthorn and grass.
					W	Emb	10	Recently cleared and burnt slope with little vegetation remaining especially above. Main cover bare ballast near line and litter near the fence. Some species surviving from what must have been deciduous scrub: gean, Tamus, blackthorn.
					E		6.2	Rather disturbed site with patchy flora of bramble thickets, low scrub and coarse grassland. Some fire sites are present and goose-grass is abundant with the bramble. Tall herbs are common e.g. Teucrium. Some scrub-cutting but limited.
CE84	2 June	TQ 424092	Lewes	Brighton-Eastbourne	SW	Cut	5	Tall herb-rich grassland with Bromus/Brachypodium sylvaticum/fescue mixed with scattered low bramble. Few species but knapweed and Leucanthemum common. There are better turf areas with scrub also.
					NE		12.2	Steep chalk slope with much bare soil. Patches of privet are common, with ivy underneath. Rest is herb and species rich floriferous community of Leucanthemum, daisy, Medicago, Pilosella, knapweed and plantain etc.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
					W	Emb	5.6	Low bank with broad grassy flat above and reedbed/marsh below. The slope itself is covered in rank Arrhenatherum grassland which is species poor but herb rich with abundant Galium mollugo and Leucanthemum. Scattered tall hawthorn bushes.
					E		7.1	Mainly rather open bramble thicket with scattered low bushes above and tall herbs; nettle and thistle near bottom which has a marshy ditch. Cypress spurge.
CE85	3 June	TQ 548054	Wilmington	Brighton-Eastbourne	SW	Cut	3	Low bank with broad flat above. Short herb-rich grassland with scattered low shrubs. Fescue/Arrhenatherum/Brachypodium sylvaticum with bramble/blackthorn. Cinquefoil and violet common in grass.
					NE		4.6	Herb- and species-rich fine-leaved grassland with fescue/Poa dominant with abundant Centaurea nigra, Galium mollugo and Leguminosae. Scattered low bramble. Lathyrus nissolia occurs.
					S	Emb	5.4	Low bramble thickets on low bank with patches of coarse Arrhenatherum locally. Some briar and bindweed, and ballast amongst the soil.
					N		6.7	Mainly rather tall dense bramble with much emergent nettle, and Arrhenatherum also above, the latter dominating the upper fringe. Hedge at bottom has blackthorn spreading from it and there are several tall ash trees along bank. Herb-rich weedy patches.
CE86	4 June	TQ 838145	Three Oaks	Hastings-Ashford	E	Cut	15.7	Ash/birch woodland near line with scrub layer of hazel and open undergrowth of bramble/briar. Bluebell/anemone on litter strewn ground. Above oak dominates and Holcus mollis becomes common.
					W		7.5	Mainly acid oak woodland with scrub-layer of hazel and bramble/ briar undergrowth. Ground layer of Holcus mollis/Anemone/Lonicera. Rather open near the line and more bushy.
					E	Emb	12.2	By line hazel scrub with litter and ballast below. The ballast has much Anemone colonising it and bramble near light. Below tall oak/ birch woodland with hazel in understorey. Ground cover of bluebell and Anemone with moss. No undergrowth here.
					W		12.2	Hazel/hawthorn scrub all over bank with some emergent birch. Ground cover of ivy and mercury - both abundant. Bramble undergrowth in less shaded parts near line.
d) WEST SUSSEX								
CE89	1 June	TQ 298142	Clayton	Victoria-Brighton	W	Cut	14	Generally scrubby with low privet, gorse, hawthorn and briar covering slope. However there are large areas of forb-dominated rather tall vegetation of Glechoma, Clinopodium, Hypericum. Grass almost absent. Rabbits?
					E		20	Some calcicolous scrub near tunnel mouth and scattered elsewhere. Generally short grazed herb- and species-rich calcicolous turf with no clear dominant but little grass, and much Clinopodium, Centaurea and Plantago media.
		TQ 305158	Hassocks	Victoria-Brighton	W	Emb	29	Mixed deciduous scrub of sallow/ash/hazel with guelder rose, and dogwood. Much Clematis in the canopy and as lianes. Ground cover of ivy with sparse herbs. At bottom disturbed and open; bramble.
					E		28	Patchy vegetation; generally an equal mixture of low scrub and rank grass patches with tall herbs. Damp with Rubus caesius, alder, Eupatorium, meadowsweet, hawthorn and Calamagrostis. Cinder flats by line.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
CE91	9 June	TQ 250366	Ifield	Crawley-Horsham	N	Cut	2.1	Mosaic of oak scrub, patchy thorn and bramble, with areas of rough herb-poor grassland. Along low bank by broad flat above. Arrhenatherum/fescue grow with thistle in the grassland.
					S		2	Similar variety to north side but more clearly zoned with scrub in west and grassland in east. The grassland is herb- and species-poor composed of Arrhenatherum with fescue/Poa/Dactylis.
					N	Emb	6.2	Tall open canopy ash/alder woodland above pond. Sparse scrub layer of alder, hazel and guelder rose. Abundant bramble in undergrowth. Ground cover of ballast above or ivy and mercury where it is darker.
					S		6.3	Open canopy ash woodland with scrub layer of blackthorn and elder. Undergrowth of bramble and briar especially on scrub edge. Patches of rough grassland with nettle and goosegrass occur by line.
NCC SOUTH REGION								
a) BERKSHIRE								
CE81	25 May	SU 458666	Enborne	Reading-Westbury	N	Cut	4	Rank herb-poor Arrhenatherum grassland with low bramble scattered throughout as sub-dominant. A few bushes of hawthorn and sycamore occur and there are locally patches of species-rich short sandy turf with bare soil, Saxifraga granulata, Trifolium dubium, Rumex acetosella.
					S		5	Rank herb-poor Arrhenatherum grassland with little or no forbs or woody growth except Rumex acetosa and apple. There are other grasses present e.g. Festuca pratensis and Poa.
					N	Emb	7.3	Tall rank herb-poor Arrhenatherum grassland with fescue/cocksfoot occasional. This goes down to a hawthorn hedge from which bramble is spreading in high thickets. Blackthorn amongst hedge.
					S		4.3	Tall rank mixed grassland/herb-poor with Arrhenatherum commonest mixed with fescue/cocksfoot, Poa and Anthoxanthum. Sparse hawthorn bushes. Ballast near line colonised on both sides.
CE105	6 July	SU 828623	Sandhurst	Wokingham-Farnborough	E	Cut	11.3	Generally open Erica cinerea sward with grassy patches or barer places colonised by Polytrichum and Rumex acetosella. Tall emergent bracken and frequent low oak bushes. The lower edge has a bramble thicket and the upper part is shaded by elm/Robinia belt.
					W		8	Mainly oak/birch scrub with some Castanea. Some Rubus underneath and ground cover of open grass - Holcus mollis, fescue and Deschampsia flexuosa.
					E	Emb	11.2	Low open Pteridium community over mixed fescue/Holcus mollis grassland. Sparse bramble, low oak colonising Hieracium spp. common. To the north areas of mixed deciduous scrub: birch/oak with scattered herbs under it.
					W		10	Low oak scrub with dense bramble/briar undergrowth. Some Pteridium mixed in, and moss/bare soil underneath. To the north the scrub becomes taller and denser with sallow and alder also present.
b) HAMPSHIRE								
CE77	21 May	SU 349063	Beaulieu Road	Southampton-Bournemouth	E	Cut	4.8	Once burnt fescue grassland with bents common. Gorse scattered near line. Herb-rich with much Teucrium, Pilosella and plantain. Ulex minor and Agrostis setacea.
					W		3.1	Mostly rather coarse Molinia grassland with much litter, violet and fescues. Towards top the fescues take over in herb-rich sward with Pilosella, Myosotis and Equisetum. Sparse bramble and a number of calcicoles. To the north becomes heathy with pine trees along top.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
					E	Emb	6.2	Very poor slope covered in dead Pteridium fronds with no live material. Bare ballast under this and little or no other vegetation emergent - sparse fescue. Teucrium and Molinia, together giving less than 20% cover at most.
					W		6.1	Upper two-thirds of slope bare cinder and ballast with very sparse vegetation of Teucrium and annuals. The lower edge has Agrostis/Molinia grassland with heath species e.g. Erica cinerea, Calluna, Carex binervis and C. pilulifera.
CE79	23 May	SU 738170	Glass Brow	Guildford-Portsmouth	E	Cut	15	Mixed deciduous scrub often rather open and with grassy patches and bare chalk soil exposed. Scrub made up of hazel and birch or locally beech. There are patches of ivy. The grassland is herb- and species-rich dominated by Brachypodium sylvaticum with much moss, Poterium, Lotus, etc.
					W		6.9	Mixed deciduous closed scrub of birch with hazel, dogwood, sallow and beech. Ground cover mainly litter, but sparse Brachypodium sylvaticum and moss occur.
					E	Emb	3.4	Dense closed canopy hazel/dogwood scrub with spindle, rose and other species. Ground layer of mercury and other herbs scattered over litter-strewn ground.
					W		7.1	Mixed deciduous scrub of hazel and sallow with other species especially near the line. Bramble in the undergrowth but being shaded out. Ground cover mainly litter but patches of Lamiastrum and Mercurialis occur.
CE80	24 May	SU 545070	Fareham	Fareham-Southampton	S	Cut	7	Patchy vegetation of bramble thickets and herb-rich fine-leaved grassland, of fescue/Poa/bent with some Arrhenatherum. Light scrub scattered through also. Rumex acetosa, Centaurea nigra and Viola riviniana common.
					N		8	Mosaic of habitats; bramble thickets, low thorn scrub, tall birch trees, coarse Arrhenatherum grassland and herb-rich fescue/Poa turf with Anthoxanthum and Fragaria. Hogweed, Vicia spp. and cinquefoil common by line.
					S	Emb	20.5	Tall birch woodland with oak subdominant. Ash in the understorey and scrub layer of hawthorn and hazel. Elder scrub zone near top and bramble/briar undergrowth throughout. Ground cover of ivy with litter, bare ground and moss.
					N		16	Woodland of birch and ash with oak near line. Scrub layer dense near line with blackthorn and hazel. Ground cover of ivy especially by line, plus moss and litter.
CE103	4 July	SU 829554	Fleet	Waterloo-Basingstoke	S	Cut	4.3	Mainly Deschampsia flexuosa grassland, herb- and species-poor. Some Jasione and Hieracium sp. There is sparse Calluna and Erica cinerea. Birch scrub grows here, the thickest parts near the access point.
					N		4.5	Some gorse and bramble scrub. Generally very disturbed vegetation covered in litter and with patchy dry Arrhenatherum grassland with Dactylis growing on old ballast dumpings.
					S	Emb	5.2	Mainly rather tall bramble thickets overshadowed by alder rooted on damp flat below. Some scrub areas of Salix spp. Ground cover mainly litter.
					N		5.6	Generally covered in quite high bramble thickets but with coarse Arrhenatherum/fescue grassland near the line; some patches of sallow scrub and commonly Pteridium emergent from bramble. Ballast slope with cinder on both sides.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
c) OXFORDSHIRE								
CE118	16 August	SU 591852	Cholsey	Paddington-Swindon	SW	Cut	8.4	Rather disturbed site with much bare soil and a mixture of low scrub especially hawthorn, rough grassland with nettles and carpets of Convolvulus and ivy.
					NE		5.6	Retaining brick wall covered in festooning ivy. Short gentle slope above it covered in mixed deciduous scrub of lilac/hawthorn over a dense continuous ivy carpet.
					SW	Emb	7.2	Very disturbed site; cleared to expose bare cinder and ballast and now being recolonised by sparse nettle, ragwort and annuals. Vegetation more continuous below with some grass clumps.
					NE		10.3	Mixed rough vegetation with many bramble thickets, rather low. Coarse grassland of Bromus erectus, Arrhenatherum, Poa and fescue. Herb-rich with Galium mollugo, Clinopodium etc.
CE120	18 August	SP 468116	Yarnton	Oxford-Worcester	N	Cut	5.8	Generally rather overgrown with large bramble thickets, encroaching scrub and coarse grass/herbs. Small areas of herb-rich turf do survive with fescue, Bromus erectus, Thymus, cowslip and Cirsium eriophorum.
					S		3.2	Much more open and generally grassy though with some scrub and bramble areas. Mixed rather damp grassland of Deschampsia caespitosa/ Arrhenatherum with many other grasses. Generally herb poor.
					N	Emb	5.2	Mixed coarse vegetation near the line of rank grasses (Arrhenatherum, Bromus erectus), tall herbs (thistle, horsetail, Tussilago, Lathyrus) and bramble. Near the bottom, tall-herb dominated; rosebay, nettle thistle, Epilobium hirsutum with some bramble underneath.
					S		5.8	Mixed herb-poor grassland of Arrhenatherum/Poa/Dactylis/fescue. Some patches of Lamium album. Parts cut recently. Rest showing spread of woody growth
d) WILTSHIRE								
CE72	16 May	ST 854590	Trowbridge	Westbury-Bradford Junction	NW	Cut	7.8	Coarse Arrhenatherum grassland with Anthriscus common below and invading blackthorn above. Glechoma common and many ant-hills. Quite forb-rich. Hedge at top.
					SE		4.5	Rough mixed grassland of Arrhenatherum with patches of Poa/fescue. Speedwell V. chamaedrys common on ant-hills. Forb-rich. Hawthorn hedge above and calcicoles in grassland elsewhere.
		ST 865551	Yarnbrook	Westbury-Bradford Junction	W	Emb	15.7	Varied site; upper edge rough herb-rich grassland with fescue and weeds. Line of hawthorn bushes below then bramble thickets. Finally a tall herb zone of meadowsweet, nettle and goosegrass on mossy slope by ditch.
					E		13.5	Disturbed site with line of Salix fragilis along bottom by stream. Rest has fescue colonising cinder, weedy flora of Cardamine, Rubus and moss. Under willow nettle stand over ivy carpet.
CE75	19 May	ST 985298	Panters	Yeovil-Salisbury	N	Cut	4.7	Rank herb-rich Arrhenatherum grassland. Frequent shrubs and low-arching bramble. Patches dominated by Pilosella and Glechoma. Some earth slippage and ant-hills plus sparse ballast dumping below.
					S		4.9	Rank herb-poor mixed grassland of Arrhenatherum/fescue/Poa with scattered low bramble and a matrix of litter between the clumps. Burnt in the past and scrub-cut more recently.
					N	Emb	5	Low ballast strewn slope dominated by a rather open nettle stand. Toward bottom becomes more open and Arrhenatherum is established with fescue.
					S		4.2	Rank mixed Arrhenatherum/fescue grassland on low bank. Quite herb-rich with a lot of Lamium album, and hogweed etc. Ballast dumpings colonised; and ditch at bottom of slope.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
CE76	20 May	SU 227390	Newton Toney	Salisbury-Basingstoke	N	Cut	6.5	Lower part unstable community with open vegetation on chalk rubble. Scattered woody growth and open Bromus grassland with Fragaria. Above this almost sheer chalk cutting with similar flora very sparse on crevices.
					S		11.2	Mostly open chalk rubble below low cliff. Vegetation sparse with Arrhenatherum, ragwort, etc. < 25% cover. Cinder flat of old line below and areas of good grassland and chalk cliff nearer access point.
					N	Emb	6.2	Mixed herb-rich fine-leaved grassland with fescue and Arrhenatherum etc. Lower slopes have pine and beech trees scattered along and underneath a coarser grassland with rosebay, nettle and bramble. Elm scrub and tall woodland elsewhere on bank.
					S		3.8	Low end of bank. Herb-rich and mixed calcicolous grassland of Bromus/fescue/Poa. Blackthorn/briar patches and rabbit disturbance generally to give bare soil.
CE78	22 May	SU 256270	West Dean	Salisbury-Southampton	N	Cut	2.3	Mixed open low scrub with herb- and species-rich chalk turf in between. Fescue/Poa/Brachypodium sylvaticum with Pilosella, Poterium, Knautia etc. Hawthorn, Clematis, oak and ivy in scrub. All under lime trees on neighbouring land.
					S		5	Tall damp grass slope with abundant tall herbs and mossy patches amongst patchy scrub of Salix, Swida, etc. Meadowsweet abundant and Arrhenatherum/fescue over rest. Herb-rich and species-rich between bushes.
					N	Emb	5	Embankment covered in ballast colonised by tall herbs especially Epilobium spp. and bramble with dogwood. Litter obscures most of the ballast and a line of pine trees on the flat below shade most of the bank.
					S		4.8	Also ballast covered and with this exposed above and under low scrub of dogwood with bramble/briar that covers most of slope. Other types of scrub and thicket occur on the slope.
CE117	15 August	SU 024811	Trow Lane	Swindon-Bath	S	Cut	30	The lower half is coarse herb-poor grassland of Arrhenatherum. Some parts are disturbed with cocksfoot, many herbs, bare soil, moss and bramble. Oak trees are common above with nettle, bramble and grass.
					N		52	The lower half is rather short herb- and species-rich calcicolous grassland with parts forb dominated. Bromus erectus and Festuca arundinacea important. Top half blackthorn/hawthorn scrub with much bramble.
					S	Emb	24	Gentle slope; upper edge has ballast dumping and open Arrhenatherum grassland. Middle area Agropyron grassland with Betonica/Silaum/Serratula. Lower half oak woodland with tall understorey of hawthorn. Cleared undergrowth and main ground cover low mosses.
					N		27	Some dumped sand above and scrub of oak below and to west. Mainly tussocky herb-poor grassland of Alopecurus, Deschampsia caespitosa and Arrhenatherum.
NCC SOUTH-WEST REGION								
a) AVON								
CE114	8 August	ST 650798	Winterbourne Down	Swindon-Bristol	N	Cut	17	Sandstone rock cutting with rough grassy scree slope below dominated by Arrhenatherum and Acer bushes. Rock face with Digitalis/Bromus erectus at bottom and sparse cover of Aira and Hieracium on rock itself. Herb rich brome grassland on gently sloping west end.
					S		17	No scree slope below. Mostly bare sandstone with sparse colonisation on ledges of Arrhenatherum, Silene vulgaris, sycamore and Quercus cerris.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
					N	Emb	22	Zone of open ballast near line with colonising ash and Centranthus. Near bottom dense bramble thickets and much hawthorn scrub. In between herb-rich, species-poor grassland of Teucrium/Solidago/Hieracium with Arrhenatherum/fescue/Brachypodium; + moss/Pilosella.
					S		18	Upper part low privet scrub, bramble/briar and coarse open grassland with Centranthus on loose ballast. Below tall ash scrub over continuous ivy carpet.
b) CORNWALL								
CE66	30 April	SX 198648	Doublebois	Plymouth-Penzance	N	Cut	10.8	The lower half has had its scrub cover cut right back and a resultant rush of herbaceous growth; nettle, mercury and goosegrass below; herb robert above. Much cut litter and upper edge is sycamore/rhododendron scrub surviving.
					S		15.4	Lower portion scrub cut and with regenerating ash/Rhododendron etc. Mixed with grass and tall herbs-primrose, herb robert, etc. Rest of bank covered in Rhododendron scrub, cut and regenerating below, uncut and tall above.
					N	Emb	25.6	Embankment over stream valley covered in oak/sycamore woodland with birch understorey. Ground cover of conifer litter from adjacent plantation with Hedera and Phyllitis. Upper edge cut-back hazel/rhododendron scrub.
					S		6	Slope covered in open bramble with scattered scrub of ash cut back above. Ivy and nettle frequent. Large areas litter covered and some shade from birch on adjacent land.
CE67	1 May	SW 544361	St. Erth	St. Ives branch	E	Cut	12	Lower portion steep slope with some exposed rock and patches of moss and dry grassland of bent and Anthoxanthum with some bramble. Giving way through a patchy area to gorse dwarf scrub at top of slope. Considerable cutting.
					W		10	Below a mixture of herbs and bramble/gorse with foxglove, Teucrium and ivy common and much Holcus mollis. This has been considerably cut back. The upper slope is dense bramble with some Clematis over litter and moss.
					E	Emb	7.7	Rather low open oak/sycamore scrub with patches of gorse. Ground cover of ivy and litter, plus bluebell. Running down to salt marshes of Hayle estuary.
					W		9.6	Cut privet scrub with bramble and Clematis over and a ground cover of litter giving way below to vegetation similar but with some gorse and a richer ground cover with moss etc. Some shade from sycamore in neighbouring land.
CE68	2 May	SX 106578	Milltown	Plymouth-Penzance	E	Cut	8	Patchy oak/sallow and gorse scrub with undergrowth of bramble and abundant litter. Some grassland and exposed rock areas.
					W		25	Large slope with three zones. Lower edge has much ballast dumping and has been cut back. Bulk of slope covered in sallow scrub with oak/hazel and hawthorn plus grasses/gorse/broom in more open parts. Gentler slope at top has bramble thicket over bluebells and litter.
					SE	Emb	4.5	Upper edge cut back to produce short forb-rich fescue and litter grassland with Dactylis, Potentilla and Leucanthemum. Dense close bramble below.
					NW		9.9	Mixed deciduous scrub of oak, blackthorn, hazel and hawthorn, over undergrowth of bramble and ivy; and ground covered in oak leaves. Ivy cover especially near line where scrub cut back.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
c) DEVON								
CE62	26 April	ST 322017	Axe Bridge	Yeovil - Exeter	NW	Cut	11.4	Sprayed and burnt with a flora dominated by dying bramble thickets. Some rough grassy areas above and local tall shrubs.
					SE		6.4	Mainly rough bramble thickets with scattered tall ash bushes and some patches of coarse Arrhenatherum above. Ballast dumping below.
					NW	Emb	2.6	Low and mainly bramble covered with nettle patches. Rough weedy areas. Dumping of concrete slabs and waste metal has occurred all through.
					SE		2.5	Abundant bare ballast with patches of low bramble, Arrhenatherum and annuals. Low and by meadow.
CE64	28 April	SS 458236	Landcross	Meeth branch	SE	Cut	11.2	Up to tunnel mouth with rocky areas present. Some bramble patches and low scrub in mosaic with herb and species-rich grassland - mixture of low species, no clear dominant.
					NW		7.6	Lower and rather less varied with much more bramble giving way near line to rough grassland mixture. Nearer the tunnel again more rocky with ferns, mosses and a generally richer flora.
		SS 463224	Weare Giffard	Meeth branch	E	Emb	3.1	Rough patchy Arrhenatherum grassland with areas dominated by Mercurialis perennis and bramble on nettle. Abundant moss etc. The bank becomes more woody southward to produce tall ash scrub.
					W		1.7	Upper edge mixture rough Arrhenatherum grassland and Mercurialis patches. Bramble, nettle and Clematis common and bramble dominant below.
CE65	29 April	SS 652000	Greenslade	Meldon Quarry branch	N	Cut	4.8	Recently burnt grass and bramble bank with scattered scrub. The grass (Arrhenatherum) is regenerating and some herbs are recolonizing. Some herb-rich grass among scrub remains nearby.
					S		8.7	Rather open ash/hazel scrub with birch and sallow in partial shade of oaks on neighbouring land. Some woody creepers below. Ground cover of moss with some litter and a few shade-living herbs. Running water in ditch at edge of line.
					N	Emb	10	Sallow scrub with oak/birch/hazel and ground cover of ivy with bramble and nettle. Moribund, and much of upper part fallen or cut.
					S		15.2	Upper slope covered in fine gravelly ballast, overhung below by scrub which covers the rest of the bank. Open birch scrub with Salix spp. over ground cover of Arrhenatherum and litter. Oak is co-dominant in parts.
CE69	3 May	SX 441661	Furzehill	Gunnislake and Bere Alston branch	E	Cut	7.8	Steep rocky cutting with mixed herb vegetation, sparse bramble. Few grasses below, ferns and many forbs present. Upper slope gentler and rosette forb/ephemeral/moss and lichen turf formed. Species and herb-rich. Variety of species.
					W		6.1	Lower portion steep generally bare rock. Above this becomes gentler and grassy. Mixed acid grassland - very species rich with a lot of moss and bents. Sparse bramble and some bilberry patches. Hypochaeris especially common.
					E	Emb	19.5	Mixed deciduous tall scrub of gean/oak/hawthorn/ash and hazel with oak commoner below. Damp slope with woodland flora of bluebell, primrose and ivy etc. Upper edge cut back and tipped upon, some grass present.
					W		17.5	Mainly rough disturbed grassland of Anthoxanthum/Holcus lanatus and plantain. There is a lot of bare ground and many colonising weeds. The upper edge has a zone of bramble followed by closed herb-rich turf by line.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
CE70	4 May	SX 759604	Tigley	Exeter-Plymouth	N	Cut	9.8	Cut and regenerating low open sallow scrub with disturbed soil in between supporting Arrhenatherum, Galium mollugo, bramble, Cardamine hirsuta and Scrophularia auriculata. More stable grass with Orchis mascula and ferns to west, some bare rock.
					S		10	Similar to north but sallow taller, less disturbance and more woodland and coarse herbs remaining. Oak above with grassy edge plus bramble and briar.
					N	Emb	9.4	Hazel scrub much of which has been cut down especially above where bramble is colonising. Some Phyllitis and nettle survive with ivy in the remaining scrub which is under the shade of oak from the neighbouring land.
					S		4.6	Lower end of quite large embankment covered in low bramble with scattered low bushes especially oak and coarse herbs. Burnt and cut in the past.
d) DORSET								
CE74	18 May	SY 604972	Langcombe	Yeovil-Dorchester	W	Cut	8	Steep and low chalk slope with herb- and species-rich turf below composed of fine grasses, legumes and rosette herbs. The upper part is low dogwood scrub colonising a similar vegetation type to lower slope.
					E		28	Herb and species-rich short calcicolous turf with mosaic of vegetation and no clear dominant. Much Poa and fescue, plantain and Pilosella, cowslip and scattered low hawthorn. Some more disturbed portions.
					W	Emb	15	Rather coarse Arrhenatherum grassland with sub-dominant fescue/Poa and Helictotrichon pubescens. Herb-rich with abundant knapweed and hawkbit. No woody growth bar a few dead low bushes. Bare ground patches near top. Burnt.
					E		9.9	Similar to latter above where ballast dumpings have been colonised, Anthoxanthum also common. Lower slope is herb-poor coarse Agropyron repens grassland with a few other grass species and some hogweed. Burnt.
e) SOMERSET								
CE61	25 April	ST 522286	Charlton Mackrell	Taunton-Westbury	S	Cut	37	Herb-rich rather short calcicolous grassland with many ant-hills and mosses (Arrhenatherum/Brachypodium sulvaticum plus finer grasses). Little or no woody growth.
					N		39	Coarser and more disturbed - patches of bramble, rough Arrhenatherum and bare soil with low calcicoles. Burnt in places and few shrubs.
					S	Emb	32	Upper part ballast, low bramble and privet thickets. Most of slope rough Arrhenatherum grassland with much bare ground, moss and scattered woody growth. Leucanthemum abundant. Grazed.
					N		9	Much smaller and mainly scrubby. Low bramble and hawthorn scrub with rough grassland patches of Arrhenatherum. Some ballast above and scrub-cutting below. Ivy is common.
CE63	27 April	ST 153220	Asham House	Taunton-Exeter	N	Cut	9	Severe ballast dumping and bare soil below giving way above to coarse herb-poor Arrhenatherum grassland. Scattered bramble patches and low hawthorn.
					S		12.6	Three zones: 1) Lowest disturbed and ballast dumping; 2) middle half or more bramble thicket with scattered bushes; 3) top quarter is coarse herb-poor Arrhenatherum grassland with fescue (red) and a little bramble.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
					NW	Emb	7.2	Slope rather disturbed by ballast tipping and with much bare ground, litter. Patchy cover of bramble with rather frequent tall shrubs of oak, ash, etc.
					SE		7.2	Dense bramble over most of slope with a few young trees. Upper edge cut back to give coarse Arrhenatherum grassland. Abundant nettle among bramble.
CE71	5 May	ST 314414	Puriton	Bristol-Taunton	E	Cut	11	Mixture of bramble thickets with coarse herb-poor Arrhenatherum grassland. Much ballast dumping below and ant-hills above. Scattered scrub.
					W		10	Very disturbed and more woody. Ballast dumping and scrub cut though latter survives to north. Rough bramble and Arrhenatherum vegetation below gives way to hawthorn/bramble/briar thicket on upper slope.
		ST 314350	Huntworth	Bristol-Taunton	E	Emb	7.5	Severe ballast tipping colonised by blackthorn scrub, bramble shaded out and Arum present. Upper edge sprayed and cut to produce rough grass and bramble common where light penetrates scrub margin.
					W		3.2	Dense medium height bramble with abundant litter; briar mixed in and shade of elder and sallow from ditch side below. On old, now covered, severe ballast tipping.
CE73	17 May	ST 734401	Witham Friary	Westbury-Castle Cary	SE	Cut	8.1	Stepped cutting with ballast flat between the two colonised by Arrhenatherum. Main slope covered in grassland: mixed acid below on damp sandy soil with a belt of Salix spp., Arrhenatherum/fescue and more open above where it is drier.
					SW		3.6	Mainly bare sandy slope with scattered ballast and sparse vegetation of grass tussocks and herbs (fescue and Hypochaeris) becoming denser above.
					SE	Emb	6.5	Ballast strewn slope: upper part with rosebay, nettle and Arrhenatherum in open community; lower part bramble thicket with some nettle patches. Moss rather common under bramble.
					NW		3.3	Broad spread ballast over slope with patchy Arrhenatherum grassland covering c. 60%. Scattered scrub - sycamore and hawthorn.
NCC WEST MIDLAND REGION								
a) GLOUCESTERSHIRE								
CE115	9 August	ST 565959	Tidenham	Gloucester-Newport	N	Cut	3.3	Variable along length with bramble thickets (plus intermixed bittersweet and honeysuckle). Rough grassland of Arrhenatherum and Holcus lanatus. Scrub patches of hawthorn, oak and ash.
					S		4.4	Rather less bramble than north, and fewer bushes. Generally rough grassland with fewer herbs or species. Transect through bramble patch. Shelter belt of pine behind fence.
					N	Emb	17	Large bank with areas of mixed rough grassland of Arrhenatherum and Holcus lanatus. Many bramble thickets, some moribund and becoming nettle patches. Some ash scrub; and block scree with ferns.
					S		15.3	Mainly dominated by bramble thickets but with rough Arrhenatherum patches especially above where Potentilla reptans is common. Below the bramble gives way to nettle, mixed with reed and Glechoma by marsh on flat.
CE116	10 August	SO 812050	Stonehouse	Gloucester-Swindon	S	Cut	4.6	Mainly rather wooded - sycamore with bare, cleared ground area. Transect through bramble thicket with nettles emergent, plus Eupatorium and thistle. Scrub colonisation by sallow and dogwood.
					N		22	Retaining wall at bottom. Large areas of nettle, with grass mixed in or understorey of arching bramble and ground cover of Glechoma. Some bramble thickets, scrub patches and coarse herb-poor grassland.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
		SO 824049	Ebley	Gloucester-Swindon	S	Emb	8.5	Gentle slope near line recently covered in fresh ballast and now being recolonised by bindweed etc. The steeper bank below is covered in bramble thickets and coarse Arrhenatherum grassland.
					N		7.4	Very disturbed, burnt and weedy. Rough mixed vegetation of Arrhenatherum and tall herbs especially rosebay, but also nettle and comfrey. Some bushes remaining and areas of bare soil.
CE119	17 August	SP 222282	Evenlode	Oxford-Worcester	W	Cut	5	Mixed rough vegetation of coarse Arrhenatherum/Dactylis grassland invaded throughout by bramble from above. Thistle and Convolvulus common but generally herb- and species-poor. Many ant-hills among the coarse growth.
					E		8.7	Herb- and species-poor grassland with little or no woody growth throughout. The lower part dominated by tall Arrhenatherum with Poa etc. The upper edge is mainly Agrostis spp. with Poa underneath. Many ant-hills.
					W	Emb	7	Dense bramble thickets with intermixed nettle and Convolvulus over ballast slope. Patches of low scrub of blackthorn occur with nettle, meadowsweet, dock and thistle. The ground below the tall herb areas is moss colonised.
					E		3.7	Low bank down to hawthorn hedge. Coarse herbaceous vegetation on slope dominated by horsetail; with Poa, Convolvulus and yarrow above; and with Arrhenatherum, meadowsweet, nettle and Stachys below. Ballast slope.
b) HEREFORD AND WORCESTER								
CE111	2 August	SO 501663	Orleton	Newport-Shrewsbury	SE	Cut	25	Large slope covered in a mixed coarse vegetation made up of varying amounts of Arrhenatherum, bramble, horsetail and thistle. Some areas of sallow scrub and patches of herb-rich acid turf.
					NW		20	Rather more variable: areas similar to other bank but with nettle common. Also species-rich mixtures of tall grass and low bramble with hogweed, Clinopodium and Picris hieracioides common.
					SE	Emb	7.2	Mainly dense high bramble thickets, with some emergent grass, nettle and horsetail. There is litter covering most of the ballast slope below, and patches of rough grass and low hawthorn.
					NW		7	Generally rather open medium-height bramble, with frequent emergent shrubs e.g. sallow, oak and hawthorn. There are patches of emergent Arrhenatherum, and abundant Equisetum arvense and Galium aparine.
CE112	3 August	SO 901457	Besford	Bristol-Birmingham	W	Cut	4.5	Rather open recently burnt calcicolous grassland, herb- and species rich with Bromus erectus commonest with sparse bramble. Much bare soil and characteristic limestone species, Clematis thickets and unburnt grassland also occur.
					E		4.7	Rough quite species-rich and herb-rich calcicolous grassland of Brachypodium spp. etc., being colonised by Clematis, Rosa and low bushes e.g. apple. Some bare ballast below. Areas of more open; and denser types occur elsewhere.
					W	Emb	5.7	Rather open disturbed community developed on ballast slope. Bramble/ Calystegia and bittersweet scrambling over ballast and some relict Arrhenatherum. Senecio viscosus colonising open ballast abundantly.
					E		5.5	Very similar to other bank in broad type. Cinder is more important than ballast and Convolvulus replaces Calystegia, and is commoner. Bittersweet is much rarer.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
CE113	4 August	SO 903635	Droitwich	Worcester-Bromsgrove	S	Cut	4.8	Tall herb-poor Arrhenatherum grassland with fescue. Some patches of hawthorn and bramble; and tall ash trees. Poa and clover frequent. There are areas of bare soil recently cleared and colonised by weeds etc, to west.
					N		6.5	Mixed coarse herb-rich but species-poor grassland of Bromus erectus and Arrhenatherum. Herbs commonest with brome e.g. Convolvulus, Galium verum, Centaurea nigra and yarrow. Bare soil areas to west.
					S	Emb	8	Upper part is coarse herb-rich but species-poor Arrhenatherum grassland with abundant Glechoma and Convolvulus. Toward bottom is replaced by nettle stand with sub-dominant Galium aparine clambering through.
					N		4.8	Tall nettle stand with scrambling undergrowth of Galium aparine and bramble. Ground cover moss and ivy, both very common. Some bushes scattered through, and areas of grassland near broad flat above.
NCC SOUTH WALES REGION								
a) MID GLAMORGAN								
CE98	26 June	SS 871890	Pont Rhyd-y-Cuff	Maesteg branch	SW	Cut	3.8	Mixed coarse vegetation of Pteridium in open stand over rough Arrhenatherum grassland, low bramble and Calystegia. Litter abundant.
					NE		6	Mainly bramble thickets with scattered willow bushes. Nettle and ferns frequent under the bramble. Areas of herb-rich dry grassland with Trisetum, Vulpia and Anthyllis. Some effect of neighbouring gardens in flora. Considerable bare soil and disturbance.
					SW	Emb	8.2	Mixed coarse vegetation of Pteridium and bramble over thick ground cover of litter. Frequent buches of oak and some coarse grassland. Vegetation becomes less dense near line.
					NE		8.2	Medium height oak woodland with no understorey. Field layer open with ferns, tall grasses and herbs. Ground cover of sparse ivy and moss. There are more open bramble areas to the south and heathy flats.
CE102	30 June	ST 141865	Caerphilly	Caerphilly-Taff's Well	NW	Cut	14.6	Mostly rough mixed acid grassland with Holcus mollis, Dactylis and Arrhenatherum. Tussocks of fern and scattered scrub, and low bramble. Herb-rich especially tall ones e.g. thistle, Angelica, Stachys.
					SE		9.2	Holcus mollis grassland with bent developed in recently burnt open birch scrub, with some oak. Some bramble patches, plus Rumex spp., Lathyrus, gorse and briar. Old line goes off behind slope.
					NW	Emb	12	Steep slope down to stream mainly scrub covered with oak, hazel, sallow, hawthorn and bramble thickets. Patches of herb-rich grassland occur where Equisetum arvense, Dryopteris filix-mas and Agrimonia are common.
					SE		10	Steep slope composed of unstable cinder with some ballast. Covered in tall scrub of oak with pear. Field layer of Pteridium, Urtica, Eupatorium and Galium aparine. Broad cinder flat above with birch scrub and fescue turf.
b) SOUTH GLAMORGAN								
CE99	27 June	SS 941732	Llandŵ	Barry-Bridgend	W	Cut	6.4	Cutting through Lias to Carboniferous Limestone. The rock cutting below has a number of calcicoles and sparse vegetation in the crevices e.g. Briza, Trisetum. The gentler grass slope above on the Lias has herb-rich fescue-Anthoxanthum turf with calcifuge spp. e.g. tormentil.
					E		6.6	Very similar pattern to the other side. The limestone rock face is more vegetated with Bromus erectus etc. and the grass slope is richer in species e.g. violet and tormentil.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
					W	Emb	2.6	Low bank with frequent osier bushes and other shrubs. Bramble/honeysuckle patches frequent as are areas of coarse rather damp Arrhenatherum/Poa trivialis grass.
					E		3.4	Large areas of medium bramble thicket with low thorn bushes. Patches of open weedy Arrhenatherum grassland with locally abundant Geranium lucidum. Some patches of fescue grassland also.
c) WEST GLAMORGAN								
CE97	25 June	SN 592047	Pontardulais	Llanelli-Shrewsbury	E	Cut	2.8	Open vegetation on low ballast-strewn slope. Mosaic of rossette forbs and low grasses with abundant moss. Fescue/Holcus lanatus with Hypochaeris/Plantago. Above damp flat with low willows, reed and rushes.
					W		4.2	Lower edge exposed rock with bare soil. Vegetation cover is coarse Arrhenatherum grassland with other grasses in herb-poor type. Other parts over the cutting area have birch scrub and sandy grassland.
					E	Emb	3.6	Rank weedy vegetation on low bank over marshy flat. Mainly tall forbs with sparse fescue. A little scattered bramble and low bushes. Common species include mint, Galium mollugo, Lathyrus pratensis and Equisetum spp.
					W		3.2	Badly burnt vegetation. Low bramble regenerating to give main cover with annuals, Equisetum arvense and grasses recolonising exposed soil and cinder/ballast. Marshy flat below has species that spread onto bank.
d) GWENT								
CE100	28 June	SO 310172	Triley Bridge	Newport-Hereford	E	Cut	6	Coarse Arrhenatherum grassland with fescue/Holcus mollis sub-dominant. Near the line it is herb- and species-poor, developed on ballast tippings. Near the top of the slope it is much richer with bent and bracken plus Hypochaeris.
					W		22	Clearly zoned: the lower one third is coarse herb-poor Arrhenatherum/fescue grassland developed over ballast. The upper portion is very tall dense bracken with briar and bramble in patches below, mercury and Anemone and Salix spp.
					E	Emb	6.8	Variable: large areas of low dense dogwood scrub over bare soil and ballast with mercury and Moehringia. There are tall closed nettle stands near the bottom and patches of bramble and taller ash scrub elsewhere.
					W		4	Also variable but generally more open than the east. Generally mixed rough vegetation of Arrhenatherum, bramble and meadowsweet. Fescue, ivy and litter are also common. Tall herbs are common. Scrub elsewhere.
CE101	29 June	ST 227988	Hafod-yr-ynys	Hafod-yr-ynys branch	S	Cut	16.8	Vegetation of two types with a gradual change between them. The bottom of the slope has low mixed herb-rich acid grassland of Deschampsia flexuosa and Holcus mollis/Festuca ovina, with abundant Galium saxatile. Bracken and Dryopteris gradually increase until at the top there is pure bracken stand over litter.
					N		8.4	Herb- and species-rich mixed grassland of fescue, etc. Disturbed below with Rubus; and with forbs co-dominant above in a low turf including Trisetum, Carex spicata, Potentilla spp.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
		ST 247992	Craig Gwent	Hafod-yr-ynys branch	S	Emb	12.5	Very disturbed and developed on severe cinder tipping. Vegetation rather patchy with some fescue/Poa grassland, Carex flacca carpets, bramble thickets, nettle patches, open scrub of gorse etc. Geranium robertianum is common in patches as were ferns under the Rubus.
					N		3	Less disturbed but still varied. Fescue grassland with abundant strawberry near the line. Taller grassland with ferns and birch bushes lower down.
NCC DYFED-POWYS REGION								
a) DYFED								
CE92	20 June	SN 007213	Becon Hill	Fishguard branch	N	Cut	9	High overgrown Ulex with no ground cover even in more open parts except litter and bare shale. There is some Teucrium spreading in from below and bramble, hawthorn and blackthorn colonising from flat above.
					S		6.9	Lower slope steep shale rock cutting with patchy Festuca ovina grassland. Higher up slope becomes gentler and mixed herb-rich acid grassland occurs. There has been removal of gorse here and moss has colonised the bare soil.
					N	Emb	19	Three clear zones: upper edge open mixed deciduous scrub of hazel etc. with rough grass and Teucrium below it. Middle area on slate scree with Calluna, ivy and much moss. Bottom tall damp sallow scrub with climbing Rubus.
					S		19	Rather variable site. Upper edge is dry herb-rich rough grassland. Much of the slope is covered in bramble thickets and open rather moribund gorse thickets. There is young tall sycamore scrub on lower slope and scattered trees above.
CE93	21 June	SN 125011	Tenby	Pembroke/Tenby branch	NE	Cut	15	Much bare shale scree. Open gorse scrub over much of slope, rather denser near top with ground cover of ivy, litter and moss. Mixed scrub elsewhere and bare rock. Lower edge coarse vegetation of bramble/horsetail and rough grass.
					SW		15.6	Lower portion mixed woody low vegetation of gorse/ash and Lonicera, with ivy, moss and tall grass and herbs. The bulk of the slope is ash/oak woodland, willow and birch in understorey. Ground cover similar to area by line.
					NE	Emb	9.4	Hawthorn/blackthorn scrub giving way down the slope to tall ash scrub. This has an undergrowth of bramble, Geranium robertianum and ferns. The ground cover is mainly litter with ivy and moss.
					SW		13.7	Mixed deciduous woodland with ash dominant by line; oak/alder with an ash understorey below. Open mixed scrub layer with scattered bramble. Ivy carpeting ground. Ferns common e.g. Phyllitis.
CE94	22 June	SN 236170	Pont-y-fenni	Fishguard-Carmarthen	S	Cut	15.4	Mainly moist mossy quite species-rich grassland. Lower part is rather coarse with Arrhenatherum and bramble. There is a considerable patch of gorse scrub with a moss carpet below. There is short herb-rich acid turf dominated by Agrostis spp. especially near the top of the bank.
					N		6.2	Lower portion is herb-rich fescue grassland with Leucanthemum, Centaurea and Plantago. This also occurs on the upper slope. In between is open sandy Aira/Vulpia.
					SE	Emb	10	Mostly dense medium height bramble thickets with litter and moss below it. There are however big oak and sallow bushes scattered through being especially dense above where they have been cut back vigorously.
					NW		10	Mainly herb- and species-poor coarse Arrhenatherum grassland which has been burnt over in the past to remove scrub. There are areas, however, that are very mossy and more mixed in their species, being more disturbed.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	WIDTH M	NOTES
CE95	23 June	SN 369072	St. Ishmael	Llanelli-Carmarthen	NE	Cut	3.7	Rather tall red fescue grassland with sparse Arrhenatherum/ Dactylis/Agropyron. Low Rubus caesius scattered throughout. No tall shrubs. Herb-rich with Lathyrus, mercury, Silene and Ononis.
					SW		4.5	More sheltered and with scattered low bushes. Cutting through old sand-hill. Coarse herb-poor fescue grassland with dewberry and nettle invasive. Scattered areas of bare sand. Some dune flora to west.
					NE	Emb	5.6	Dense closed tall bramble thickets with emergent nettle and goose-grass scrambling through. Ground cover of ivy or moss with some bare ballast. A few taller bushes along bank and rough grass margins.
					SW		6.3	Bramble thickets over most of bank. Low and open near line, high and dense near the bottom. Some areas with many emergent tall herbs. Ballast strewn slope some of which is exposed, or bare under Rubus.
CE96	24 June	SN 620168	Llandybie	Llanelli-Shrewsbury	E	Cut	2.9	Patches of coarse herb-rich Arrhenatherum grassland with fescue/ foxtail and meadowsweet. Bramble thickets common with emergent nettle. Equisetum arvense common near line and much moss throughout.
					W		2.8	Much dead grass etc. near line. Rest of bank covered in herb-poor fescue/Arrhenatherum grassland. Some Origanum patches and Linaria repens occasional throughout.
					E	Emb	4	Mostly covered in low bramble but with several areas of tall herbs. Rosebay and grasses occur near the line and Eupatorium is common below as the bank gives way to a marshy flat. Bryophytes are abundant. Ballast dumped.
					W		3.7	Dense high bramble thickets mostly now dead due to a recent fire. Moss has colonised the exposed ballast and cinder. Scrub occurs to the north and near the bottom of the bank a marsh vegetation takes over.
b) POWYS								
CE110	1 August	SO 107650	Penybont	Llanelli-Shrewsbury	S	Cut	6.4	Generally tall, herb-poor Arrhenatherum tall grassland with raspberry encroaching especially above. Scattered tall-herbs e.g. meadowsweet, Equisetum arvense and nettle. Moss abundant under nettle.
					N		7	Lower portion very disturbed with sparse bramble, hawthorn and Arrhenatherum, with moss colonising exposed litter. Above this rough grassland with bramble mixed in. Torilis abundant and patches of garden escapes to west.
					S	Emb	5.4	Upper part rather herb-rich coarse grassland of Arrhenatherum with cocksfoot and fescue. There is much invasive raspberry especially in middle area. Dense hawthorn scrub near bottom.
					N		7.2	Variable site with rough Arrhenatherum grassland and nettle stands, plus scattered shrubs of Acer etc. Figwort and herb robert grow among grassland, and cleavers plus abundant moss under the nettle.

APPENDIX 3

BIOLOGICAL INTEREST SITES

APPENDIX 3. Biological Interest sites 1978.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	SOURCE	NOTES (PROPOSED ACTION)
NCC SOUTH-EAST REGION								
a) KENT								
B74	7 June	TR 249379	Folkestone Warren	Ashford-Dover	S	Flat	A/SSSI	Line goes through middle of very good site but the BR property here is very narrow and disturbed by the track with c. 20% vegetation cover. The Euphorbia esula s.l. and Buddleja are of some interest. Functions as barrier to exploration of the Warren proper and thus protects it from disturbance and encroachment of holiday trade. (Action : None).
B75	8 June	TR 270689	Plum Pudding Island	Faversham-Margate	N	Emb	Info.	Mentioned by NCC as being a site for good grassland - the only turf of any value occurs on an embanked track off BR land to the north. The railway here has species-poor rough grassland. The creek which goes under the line at this point has a fairly good flora with Zannichellia, Fontinalis, Potamogeton berchtoldii and Myriophyllum spicatum. (Action : None).
b) EAST SUSSEX								
B71	31 May	TQ 333178	Ditchling Common	Lewes-Wivelsfield Junction	NE	Cut/ Flat/ Emb	A/SSSI	An odd site, having extensive calcicolous grassland of Bromus erectus adjacent to the acid heath of the common. Patches of low grazed turf occur. Bramble/briar etc. occur on the flat above this cutting. Vegetation on flat and embankment increasingly coarse to the east. Culvert underline produces a small marshy area. Diversifies site but of little note. (Action : None).
B73	3 June	TQ 518073	Berwick Station	Brighton-Eastbourne	S	Pond	Flora	By BR property. Mentha pulegium recorded here? No sign of the plant or in pond closer to station but further from the line. No suitable land now actually on rail land.
					N	Cut	Disco-very	Large slope with extremely herb-rich grassland, with little or no scrub. Coloured white at a distance due to great abundance of Leucanthemum. Patches of Rumex acetosella and Medicago arabica also. (Action : None).
c) WEST SUSSEX								
B72	1 June	TQ 305158	Hassocks & Keymer	Victoria-Brighton	W	Emb	Flora	Noted as site for Dianthus deltoides and Equisetum sylvaticum. Suitable habitat for both but no specimens found. Includes CE83(Emb). Mixed deciduous scrub of sallow/ash/hazel with Clematis over ivy carpet. Some rough open ground.
					E	Emb/ Flat	Flora	Generally better for the two flora spp. but also not found. Tall herb and low scrub vegetation with dewberry on damp slope. Cinder flats of old sidings to the south with good grassland e.g. Orobanche minor and birch scrub. (Action : Note).
NCC SOUTH REGION								
a) BERKSHIRE								
B63	15 May	SU 421672	Marsh Benham	Reading-Westbury	N	Flat/ Emb	Info.	By river, flooded pit and reed-bed. Some disturbed bramble banks. Several reed-beds and sedge marshes with scrub edges: Carex riparia and typical herbs. By R72.

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	SOURCE	NOTES (PROPOSED ACTION)
					S	Flat/ Emb	Info.	More extensive with big reed-beds in the west. The bank has rather rough vegetation with bramble and weedy grassland: Barbarea intermedia present. There is better grassland near the reed-bed. By improved pasture. Polygonum bistorta occurs on BR in good grassland. (Action : Note).
b) HAMPSHIRE								
B69	21 May	SU 290001	Setley Bridge	Southampton-Bournemouth	NW	Emb/ Flat		Including and continuous either way with R78. Bramble thicket, rough grass, low scrub and species-rich grass heath. Ditch bank. Good population of Pulmonaria longifolia; also: Serratula, Genista anglica and Myrica.
					SE	Emb/ Flat		Similar but with more grassland especially Molinia and some of the turf markedly herb rich with Ophioglossum. More lungwort. Habitats unlike any in area, and notably no lungwort on gorse heath adjacent. (Action : Note ? Schedule).
B83	4 July	SU 820553	Fleet Pond	Woking-Basingstoke	S	Flat/ Emb	A/SSSI	Cinder flats with weedy grassland and birch scrub becoming more vegetated away from line. Bank has birch scrub and rough grassland.
					N	Flat/ Emb	A/SSSI	Mainly birch scrub and rough grass. Little value and no contribution to Pond other than to increase shore line and split it in two. (Action : None).
B93	4 September	SU 517438	Micheldever Spoil Heaps	Basingstoke-Southampton	E	Cut/ Flat	SSSI	Deep chalk cutting between tunnels with birch/hazel scrub over patches of herbs: Mycelis, Fragaria, Mercurialis and some orchids: Epipactis helleborine/Cephalanthera damasonium. Some bare chalk scree/cliff with patchy open vegetation.
					W	Cut/ Flat	SSSI	Dense hawthorn and mixed thickets on slope with similar vegetation to East side covering most of bank. BR land probably only covers the slopes, the spoil heaps themselves on flat above are diverse and very rich. (Action : Note. Confirm or extend Schedule (which-ever relevant)).
c) OXFORDSHIRE								
B90	16 August	SU 591852	Cholsey	Paddington-Swindon	NE	Cut/ Flat	Disco-very	Continuous with CE118. Chalk rock cutting with scree below and broad flat above. Scree has patchy herb- and species-poor Arrhenatherum grassland with Pastinaca common. The cliff is almost bare and the flat above is coarse herb-poor Arrhenatherum/Bromus erectus grassland. Rather better near CE118.
					SW	Cut/ Flat	Disco-very	Similar to NE side but closed grass on scree with scrub. The cliff has patchy scrub and the flat is narrower. (Action : None).
B92	18 August	SP 409152	Combe Cutting	Oxford-Worcester	N	Cut/ Flat	Info.	Short deep cutting east from R. Evenlode. Some retaining walls by bridge over. Slope has rough limestone grassland, bare rock, ash scrub and Clematis/bramble thickets. The flat above is a mixture of coarse herb- and species-rich Bromus erectus grassland with Orobanche elatior and thickets.
					S	Cut/ Flat	Info.	Similar and much grass in east but with tall scrub on flat in west and much Polypodium on cutting slope. Orobanche again occurs with Astragalus glycyphyllos and Salvia pratensis. (Action : Note. Schedule).

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	SOURCE	NOTES (PROPOSED ACTION)
d) WILTSHIRE								
B64	16 May	ST 828507	Redbridge Stone	Westbury-Taunton	S	Cut/ Flat	Flora	By R73 and continuous with it. Coarse Arrhenatherum grassland and bramble with some bushes and woodland herbs. The Flora reference is to a site for Minuartia hybrida. The only suitable locality is on the old bridge with ferns and herbs on its brickwork and herb-rich grassland on flat of old road.
					N	Cut/ Flat	Flora	As the other side but some cutting and burning. The demolished bridge has suitable habitat for the sandowrt, but not seen. (Action : None).
B66	19 May	ST 962296	Chicksgrove Quarry	Salisbury-Yeovil	S	Emb/ Flat	A/SSSI	By Geological SSSI and R76. Interest minimal in area by quarry with poor reed beds and bramble. With R76 however represents quite diverse area with scrub, grass, bramble, wet ground and disturbed. Thus a good species list and variety of habitat but not outstanding. (Action : None).
B67	20 May	SU 227391	Hewton Toney	Salisbury-Basingstoke	N	Cut/ Emb/ Flat	Disco-very	Including and between cutting and embankment of CE76. Chalk cutting and grassland, scrub and woodland. Rich grassland on embankment etc. and extensive flats where old line leaves used track.
					S	Cut/ Emb/ Flat	Disco-very	As other bank but with second chalk cutting and scree. Cinder flats where old line leaves used track. Juniperus, Atropa, Cerastium diffusum and Polygala calcarea. Excellent variety of habitat. (Action : Note ? Schedule).
B68	20 May	SU 19 36	Porton	Salisbury-Basingstoke	N	Emb	Flora	Supposed site for Helleborus foetidus - not found. Major cover woody with large patches of tall scrub, with bramble thickets and areas of rough grassland and tall herb. The scrub and its edge could be suitable habitat but nothing of value noted.
					S	Emb	Flora	As north bank. (Action : None).
B70	22 May	SU 252271	West Dean	Salisbury-Romsey	S	Cut	Disco-very	Ajdacent to end just East of CE78. Deep chalk cutting covered in mixed deciduous scrub of ash/Swida and maple etc. Some bramble undergrowth and patches of grassland near line. Good herbaceous ground cover.
					N	Cut	Disco-very	Similar but with tall trees near the top of the bank. To the west end, rather open with low scrub and chalk turf. Notably herb- and species-rich site with good cover for birds etc. (Action : Note ? Schedule).
B89	11 August	SU 000937	Oaksey Halt/ Swill Brook	Stroud-Swindon	W	Emb/ Flat	Info.	Supposed to have Thlaspi perfoliatum at Halt and Fritillaria on grass bank by meadow SSSI. The flat by the line is covered in recent ballast and the embankment slopes in bramble/briar with a few ash trees and patches of closed thorn scrub. There are very occasional rough grass areas. No rarities.
					E	Emb/ Flat	Info.	Very similar pattern to west and equally poor. (Action : None).
B107	8 September	ST 865696	Corsham	Swindon-Bath	N	Cut/ Flat	Geol. SSSI	Limestone rock cutting becoming very high before tunnel. Flora includes bramble thickets, low scrub, ivy curtains and coarse limestone grassland. It becomes more woody in West and has a mossy dripping cliff with a marsh below.
					S	Cut/ Flat	Geol. SSSI	Similar but less exposed rock and more generally woody throughout with brick wall shoring up cutting for much of length. Diverse animal habitats. (Action : Note).

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	SOURCE	NOTES (PROPOSED ACTION)
NCC SOUTH-WEST REGION								
a) AVON								
B106	8 September	ST 721927	Cullimore's Quarry, Charfield	Bristol-Gloucester	W	Emb	A/SSSI	Quarry here very small and grassed over. No direct contact with BR. The vegetation of the narrow banks here being bramble thicket, rough Arrhenatherum and low hawthorn. (Action : None).
b) CORNWALL								
B58	30 April	SX 115644	Newbridge Wood	Plymouth-Penzance	S	Emb	A/LNR	Small embankment with rather short herb-poor grassland and frequent bramble thickets. Mixed acid weedy flora on the ballast and some scrub cutting. No contribution to the site. (Action : None).
B59	1 May	SW 581381	Angarrack Bridge	Plymouth-Penzance	N	Flat/ Cut	Info.	Rock cutting by bridge with gorse and acid grassland on ledges. Below it and to the east ballast flats and heaps in an extensive ruderal area with c 50% vegetation cover. These areas support a rich flora with several calcicoles and aliens of interest e.g. Linaria dalmatica, Anthemis cupaniana and Campanula alliariifolia.
					S	Cut	Info.	Rock cutting with gorse and acid grassland in ledges etc. (Action : Note ? Schedule).
B60	1 May	SW 559373	Hayle Station	Plymouth-Penzance	N	Cut/ Flat	Info.	Supposed site for Allium babingtonii - not found. Flat is colonised ballast by line c 40% colonised. The cutting slope further east has herb-rich coarse grassland with Anthyllis etc.
					S	Cut/ Flat	Info.	Similar to north. Flats more extensive, bushy and with continuous cover including some Allium triquetrum. The cutting to the east is also like the North one but less coarse and with Rubia peregrina. (Action : None).
B61	1 May	SW 545367	Hayle Estuary	St. Ives branch	E	Emb	A/SSSI	Rather open and low gorse/sycamore scrub with patches of oak and pure gorse. Ground cover of ivy and litter plus bluebell. Running down to saltings of Hayle estuary - see CE67 (Emb). This site is known for its birds but BR land contributes little to the area, providing a little diversity of habitat and food/shelter. (Action : None).
B94	5 September	SW 933598	St. Dennis Junction	Newquay branch	S	Flat	Info.	Site in fork of line and Meledor Mill branch. Complex mosaic of old sidings, cinder flats and ballast/spoil heaps in various stages of colonisation with a rich ruderal flora. Willow scrub common, tall herb vegetation of Polygonum cuspidatum, Oenathera, thistles and rosebay. The site is encroaching into Goss Moor - a SSSI of lowland mire communities. The notable species present include Linaria supina, Epilobium lanceolatum, Geranium rotundifolium and Scrophularia scorodonia. (Action : Note Schedule).
B95	5 September	SW 946605	Goss Moor	Newquay branch	S	Flat (& Ditch)	A/SSSI	Narrow verge with some acid marsh and rough grass/scrub. There is some encroachment by species from acid mire SSSI adjacent e.g. Osmunda and a small population of Scrophularia scorodonia.
					N	Flat	Info.	Some old track bed with species-rich grassland with Vulpia myuros, Aira and Pilosella etc. Behind it low scrub spread from ditch sides adjacent - Myrica, Luzula sylvatica, Salix spp. and bramble. (Action : Note).
B96	5 September	SW 932505	Trenowth Wood	Plymouth-Penzance	S	Cut/ Emb/ Flat	A/SSSI	Variable: embankment with open oak scrub with mixed acidiphilous woody and herbaceous growth. A low rock cutting has rhododendron and heathers plus ferns and a ballast hopper bears a stand of Epilobium lanceolatum.
					N	Cut/ Emb/ Flat	A/SSSI	Also variable: a low embankment covered in heathers and bent; low almost pure rhododendron scrub in the flat; open oak scrub on a gentle cutting; and a high steep rock cutting, burnt with gorse and catsear. (Action : Note).

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	SOURCE	NOTES (PROPOSED ACTION)
B97	5 September	SX 076540	Par	Newquay branch	W	Flat	Info.	Margins of station car park with herb-rich cinder grassland and by a ditch uneven ground and tall willow scrub. Some marshy ground and reed-beds near the south end and a cutting slope by the access with grass/gorse heathland. Linum bienne, Scrophularia scorodonia, Epilobium lanceolatum and Rhynchosinapis cheiranthos among the notable spp.
					SE	Flat	Info.	Low bank with generally rough vegetation of hawthorn, bramble, etc, but Rhynchosinapis present and other good spp. (Action : Note).
B98	6 September	SW 780397	Perranwell	Falmouth branch	N	Cut/ Flat	Info.	Cutting at station covered mixed scrub of gorse, Erica lusitanica and a variety of other woody growth often of cultivated origin. Severely burnt in East. In west and below cutting old track bed and ballast flats with open rough grass.
					S	Cut/ Emb/ Flat	Info.	Similar but less rich in cutting and with damper slope and characteristic spp. e.g. Osmunda. Embankment to west is coarse rough grass and bramble. (Action : Note).
B99	6 September	SW 817323	Falmouth	Falmouth branch	S	Flat/ Cut	Info.	At the station ballast flats with rough grass and open Buddleja scrub: small population of Linaria supina. To the west of the bridge, much rough grassland and scrub followed by a rock cutting with a mainly woody covering.
					N	Flat/ Cut/ Emb	Info.	At the station low grass/bramble banks with Briza maxima common and some Linaria supina. West of the bridge a pine shelter belt with Raphanus maritimus under it, and finally a rock cutting with a large variety of aliens present. (Action : Note).
B100	6 September	SW 508313	Marazion Marsh	Plymouth-Penzance	NW	Flat (& Cut)	A/SSSI	Narrow area very poor compared to adjacent marsh. Low sallow scrub and rough grass with some reed-beds; disturbed and of little worth.
					SE	Flat & Ditch	A/SSSI	Similar but with more open water in ditches and consequently more reed and aquatics. Some bramble patches and Scrophularia scorodonia. (Action : None).
B101	6 September	SW 499313	Long Rock	Plymouth-Penzance	N	Flat (& Cut)	Info.	Narrow rough grass and low scrub verge with several garden escapes involved. Very poor and disturbed in general but good population of Cynodon dactylon on ballast immediately by track bed.
					S	Flat/ Cut	Info.	By sandy beach. Some bramble thickets and herb-rich grassland with abundant Daucus. Cynodon rare by fence on looser sand (v. common on dunes). (Action : Note).
B102	7 September	SX 377578	Lynher Estuary	Plymouth-Penzance	N	Emb/ Flat (& Cut)	A/SSSI	Rock cutting with acid grassland and ferns in west. High embankment covered in slate scree with Polypodium, moss, Geranium robertianum and sparse scrub. Flat below has swampy oak woodland, giving way to brackish marsh and then saltings, all on BR.
					S	Emb/ Flat (& Cut)	A/SSSI	Very similar. Scree drier with Centranthus, much Epilobium lanceolatum, bramble and spleenwort. Saltings with Halimione and Puccinellia etc. (Action : Note ? Extend Schedule onto BR land).
B103	7 September	SX 430586	Saltash Sidings	Plymouth-Penzance	W	Cut/ Flat	Info.	Cinder flats, rough track and coarse grassy cutting slope. Old tarmac area has around it a big population of Dianthus armeria and the ballast area some Geranium rotundifolium and Vulpia myuros. Ivy common on walled cutting nearer Station.
					E	Cut	Info.	Rough Arrhenatherum grassland and ivy/bramble. Poor. (Action : Note).
c) DEVON								
B57	28 April	SS 492325	Isley Marsh	Meeth & Bideford branch	N	Flat	A/SSSI	Rank herb- and species-poor Agropyron pungens grassland with no woody growth. One or two other maritime species. Adjacent to upper parts of good salt marsh. It serves to prevent the expansion of neighbouring farmland through drainage. Useful as a barrier but not as a wild area. (Action : None).

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	SOURCE	NOTES (PROPOSED ACTION)
B62	3 May	SX 441661	Furzehill	Gunnislake & Bere Alston branch	E	Cut (& Flat)	Disco-very	Continuous with CE69. Mainly a rock cutting with variety of vegetation: old track bed with herbaceous vegetation; open festooning bramble/briar, herb-rich grassland; rock cutting with scrub to 2m; scattered areas with wet rock faces.
					W	Cut	Disco-very	Rock cutting, rather more woody and with less good grassland but generally the same. A large cutting. (Action : Note ? Schedule).
B104	7 September	SX 450607	Warleigh Wood	Gunnislake/Bere Alston branch	E	Cut	Info.	Wooded rocky cutting dominated by Quercus petraea over ferns, bramble, Endymion and Holcus mollis. Some patches of heathy scrub with birch/hazel. Old track bed below with rough open grass and ephemerals e.g. Epilobium lanceolatum.
					W	Cut	Info.	Similar but with some more open areas dominated by Erica and Vaccinium or Pteridium with broom and Castanea. Scrub cutting in progress. Goes up to Tavy bridge. (Action : Note).
d) SOMERSET								
B56	25 April	ST 521286	Charlton Mackrell	Westbury-Taunton	N	Cut	Disco-very	Short herb-rich calcicolous grassland with some scrub above and to either end. The grassland has a good population of Orchis morio with Briza, Carlina, Centaurium, Cirsium acaule, Linum, Salvia horminioides, Thymus, Poterium, Viola hirta and Plantago media. The bramble and scrub thickets ajdacent support Rubia peregrina. Site between Cut & Emb of CE61 and with them of considerable value. (Action : Note ? Schedule).
B65	17 May	ST 717409	Wanstrow	Cranmore branch	NE	Cut	Disco-very	Open Bromus erectus grassland with herb-rich patches dominated by fescue. Good varied calcicolous flora including Orchis morio. Large bank with some scrub to E.
					SW	Cut	Disco-very	Rank willow and grass at bottom. Then mossy very short turf dominated by Hieracium sp., Carex flacca etc. Some damp ground with Platanthera bifolia. Above this ranker turf with sallow/sycamore scrub + primrose and wood-spurge. Large bank with rich flora. (Action : Note Schedule).
NCC WEST MIDLAND REGION								
a) GLOUCESTERSHIRE								
B84	10 August	SO 812050	Stonehouse	Gloucester-Swindon	N	Cut	Flora	Including CE116 (Cut). This may be the old site for Cirsium tuberosum and Lathyrus nissolia. Now mainly nettle and bramble, but some relict coarse Bromus erectus may indicate that this was once suitable habitat.
					S	Cut	Flora	Mainly sycamore scrub with disturbed/cleared undergrowth. No suitable habitat for the two species above. (Action : None).
B85	10 August	SO 790042	Five Acre Grove	Bristol-Gloucester	SE	Cut	A/INR	Three zones: south of wood: Bracphypodium pinnatum grassland with betony etc. By the woods: scrub with some tall trees and much bramble/Clematis giving a dense thicket. To the north of the wood: Calamagrostis epigejos grassland.
					NW	Cut	A/INR	Similar zonation: grassland richer with Bromus erectus, Lathyrus tuberosus, Cirsium eriophorum, Genista tinctoria. Very good turf by path across line. The scrub by the wood is similar but a dense Clematis thicket occurs at N. end. (Action : Note ? Schedule).

REF	DATE	GRID OF ACCESS	SITE NAME	RAILWAY LINE	SIDE	FORM	SOURCE	NOTES (PROPOSED ACTION)
B86	10 August	SO 950017	Hailey Farm Cutting	Stroud-Swindon	NE	Cut/ Flat	Geol. SSSI	Stepped limestone cutting with cinder flats below it. The cinder has herb-rich calcicolous grassland. The cutting and ledges, plus scree have patchy vegetation with ferns, moss, annuals and calcicole turf. Some coarse Bromus erectus.
					SW	Cut	Geol. SSSI	Stepped limestone rock cutting with much ash and hawthorn + moss and occasional grass areas. (Action : Note ? Consider extending Schedule to Biol.).
B87	11 August	SO 961012	Hailey Wood	Stroud-Swindon	SW	Cut	Flora	Site for Gymnocarpium robertianum and Polygonatum odoratum - neither found but suitable habitat. A limestone rock cutting with some sheer faces, but generally rather gentle with open mixed deciduous scrub especially ash and locally grass patches.
					NE	Cut	Flora	Essentially similar to SW side and like it with good population of Campanula trachelium and Epipactis heleborine and general calcicole flora. (Action : Note).
B88	11 August	ST 988960	Kemble	Stroud-Swindon	W	Cut/ Flat	Flora	Supposed site for Thlaspi perfoliatum - not seen. Old track bed suitable - herb rich grassland. Above retaining brick wall is oak/hazel/ash scrub.
					E	Cut	Flora	Similar to West with wall and scrub, but end near access point has a rather open Bromus erectus grassland area with some bare soil and typical forbs. The Thlaspi could occur there. (Action : None).
B91	17 August	SP 159413	Campden Tunnel	Oxford-Worcester	W	Cut/ Flat	Flora	A very large cutting produced by BR but now incorporated into the neighbouring land as conifer woodland. What remains is very poor. An old track bed with Arrhenatherum in patches and much Geranium robertianum. Behind it a low bank with rough grass and cut scrub.
					E	Cut	Flora	Open Arrhenatherum grassland on very narrow bank which has been heavily sprayed and scrub-cut. (Action : None).
B105	8 September	SO 914028	Frampton Mansell	Stroud-Swindon	N	Emb (& Cut)	Geol. SSSI	Mixed deciduous woodland of oak, sycamore and ash over abundant hazel. Ground cover of ivy and mercury plus Polygonatum and Epipactis. To the west: beech, yew, sanicle and Hordelymus.
					S	(Emb) Cut	Geol. SSSI	Some stone wall with Gymnocarpium robertianum; and areas of rosebay. Mainly rough cutting, scree, rough grass and open scrub with Vicia sylvatica, Mycelis, Hieracium and many herbs. (Action : Note. Extend Schedule to include Biological).
NCC DYFED-POWYS REGION								
a) DYFED								
B76	20 June	SM 926304	Heathfield	Fishguard branch	W	Emb/ Flat	Info.	Above very good lowland mire which has little affect on BR or vice versa. The value of this site lies in its open grass and ballast slope with a herb-rich vegetation including Epilobium lanceolatum and Linaria repens. Some bramble and willow scrub. Rhododendron scrub and bracken/bluebell also.
					E	Cut	Info.	Mainly gorse scrub and acid grassland (Action : Note).
B77	21 June	SS 125997	Tenby Burrows	Tenby and Pembroke branch	SE	Emb/ Cut/ Flat	Info.	Very varied but mainly on extension of adjacent dune system etc. with: reed beds, rough grass, thorn scrub, herb-rich calcicolous grassland, dune slacks and disturbed sands, plus forb-dominated embankment. 1 mile long and with Juncus acutus, Vulpia membranacea, Orchis morio, Anacamptis etc.
					NW	Emb/ Cut/ Flat	Info.	Essentially the same as other side. Valuable as a protected extension of the dunes with no access. (Action : Note ? Extend schedule already on dunes).
B78	22 June	SN 365188	Llanllwch Mire	Carmarthen-Fishguard	S	Flat (& Emb)	A/SSSI	Through middle of lowland peat bog. Most of site is low species- and herb-poor Molinia grassland. Scrub occurs to the west and there are occasional bracken patches or Carex beds. A good deal of the site has been recently burnt, and this has spread onto the SSSI. The site is thus probably deleterious to the conservation value.
					N	Flat (& Emb)	A/SSSI	Very similar but even more severely burnt. (Action : None).

REF	DATE	GRID OF ACCESS	SITE NAME.	RAILWAY LINE	SIDE	FORM	SOURCE	NOTES (PROPOSED ACTION)
B79	23 June	SN 36 07 & 36 08	St. Ishmael	Llanelli-Carmarthen	S & W	Cut/ Emb/ Flat	Info.	Long site north from CE95 for over ½ mile. Along edge of dunes and with some included on BR with Vulpia membranacea and Orobanche minor. Rough bramble/grass with Lathyrus sylvestris and Raphanus maritimus etc.; sea-wall.
					E	Cut/ Flat	Info.	Examined near north end of site: rock cutting with grassy ledges and some parts ivy festooned. Sycamore/Humulus scrub with Eupatorium at foot of cliff. (Action : Note ? Schedule parts with Lathyrus sylvestris etc.).
B80	23 June	SN 420039	Pinged Crossing	Cwmmawr branch	SE	Emb/ Ditch	Info.	Track bed known as site for Linaria supina - not found. Recently sprayed. Rough grass with tall herbs on banks including Mentha rotundifolia. Large ditch (canal) with no open water, now sallow scrub, Sparganium, Iris, Glyceria and Carex paniculata. Linaria repens present by line and Equisetum.
					NW	Emb/ Flat	Info.	Very similar with Sedum forsteranum on wall. (Action : Note).
B81	23 June	SN 417026	Ffrwd Farm Mire	Cwmmawr branch	E	Flat/ Emb/ Ditches	A/SSSI	Line South from access has broad flat with Bromus mollis etc., annuals and herb-rich vegetation on cinder. Tall reed bed with bramble by dry ditch, which has much Carex paniculata, etc. all along. The ditch's broad flat east bank has Phragmites with Phalaris, Alopecurus and Allium vineale. The marginal wet ditch by the mire has Phragmites, Callitriche and Lathyrus palustris. Rough ground on BR at access: Barbarea verna/Scroph. scorod. (Action : Note ? Extend schedule to include BR).
B82	24 June	SN 628211	Ffair-fach	Llanelli-Shrewsbury	NW	Cut/ Flat	Geol. SSSI	Rock cutting with patchy vegetation of grass and low scrub. Quarry on BR land South from here. Whole quarry shaded by large oak trees rooted on cliff top and floor. Rock face covered in bramble, or moss with ivy and ferns. Floor covered in elder, nettle, ferns and yellow archangel. The rock cutting South from quarry is similar to that to the north. (Action : None).

APPENDIX 4

RECORDING PROFORMAS AND GROUND RULES

RANDOM SITE — Direction from access: (N) S E W

REGN / DIVN / AREA / SITE: W / CF / NP / R100

94.

SITE NAME Llantwit COUNTY S. Glamorgan MP 11 DATE 27.6.78 WEEK NO 26

MAP REF AP 957699 SHEET NO SS96 DIST AP-RP 200m. RECORDER AM/SBC/JOM

ALTITUDE 240' GEOLOGY Jurassic: Lower Lias Clay/Lower Carboniferous Limestone

SITE ASSESSMENT Potentially a very good site with a limestone rock cutting and grassland with a leached flatrock Δ scrub. But in all groups did not quite live up to first impressions Δ may be too disturbed.

TRANSECT 1 North (East) | South (West) Side

Direction of track ↓ N (S) E W

F	A	S±	Mgt	Tip	NLU	Width m
2	260°	+90°	745	—		0.4
2	260°	+50°	726	—		3.3
2	260°	+28°	726	—		1.6
1	—	+/− —	726	—	804	6.9

F1 — mainly rock outcrops, bramble Δ grass killed by spray.

F2 — limestone rock outcrops with ledges Δ crevices bearing sparse Bromus erectus Δ cut hawthorn.

F3 — Dense closed Bromatum erectae Giving way onto flat to:

F4 — similar but dense bramble Δ hawthorn to boundary.

TRANSECT 2 North (East) | South (West) Side

Direction of track ↓ N (S) E W

F	A	S±	Mgt	Tip	NLU	Width m
2	260°	+90°	745	—		0.7
2	260°	+41°	726	—		4.4
1	—	+/− —	726	—		5.9
1	—	+/− —	700	—	804	3.0

F1 — mainly dead bramble, ivy Δ grass on rock face with mosses surviving.

F2 — rank grass in crevices Δ on uneven slope Bromus Δ other calcicole grasses Δ several rather mangled hawthorn bushes.

F3 — dense low bramble, with brier/hawthorn.

F4 — Overgrown hawthorn hedgerows with

TRANSECT 4 North (East) | South (West) Side

Direction of track ↑ (N) S E W

F	A	S±	Mgt	Tip	NLU	Widt m
4	—	+/− —	721	12	·	0.3
2	70°	+90°	745	—		1.0
2	70°	+47°	700	—		4.4
1	—	+/− —	700	—	805	7.8

F1 — sparse grass, mainly bare mud or rock.

F2 — rock face, dead grass Δ bramble. Some colonising moss Δ ferns (Asplenium)

F3 — terraces where grass cover important with limestone outcrops, a few forbs Δ low bramble. Bromus erectus comm

F4 — dense bramble patches with low hawthorn. Some grassy patches. Tall hawthorn hedge at boundary

TRANSECT 3 North East | South (West) Side

Direction of track ↑ (N) S E W

F	A	S±	Mgt	Tip	NLU	Widt m
4	—	+/− —	745	21		0.6
2	80°	+90°	746	—		1.4
2	80°	+42°	700	—		4.0
1	—	+/− —	700	—	805	7.9

F1 — Shallow, moving water, deep mud bed Δ few herbs.

F2 — Rock face with dead bramble and rough grass cover.

F3 — Few tall hawthorn shrubs with dense bramble undercover.

F4 — Low bramble — new growth on top of dead matted stems. Tall hawthorn

CUT/EMB SITE

Direction from access: Emb (N) S E W | Cut N (S) E W

REGN / DEVN / AREA / SITE: W / CF / NP / CE99

95..

SITE NAME) & COUNTY) Emb Llandŵ, S. Glamorgan Cut .. MP Emb 13¼ Cut 13 DATE 27.6.78 WEEK NO 26

MAP REF AP Emb 941732 Cut .. SHEET NO Emb SS97 Cut .. DIST AP-RP Emb 100m. Cut 300m. RECORDER AM

ALTITUDE Emb 180' Cut 220' GEOLOGY Emb Jurassic: Lower Lias Clay (Carboniferous limestone Cut ..

SITE ASSESSMENTS The embankment have too small to be of any worth Δ the associated flat poo Cutting rather disappointing but the mixed grassland of TQ2 Δ TQ2 of value

EMBANKMENT Transect 1 North South / East (West)

Tip, cinder Δ ballast. Spray to 0·8m.

F1 — bare ground, dead grass Δ bramble.

F2 — rank Arrhenatherum, bramble and honeysuckle (low), overhung by osier rootkd on flat below.

F4 — open osier scrub with damp grassland.

F	A	S±	Mgt	Tip	NLU	Width m
1	—	± —	745	12		0·5
3	270°	±32°	703	11		2·6
1	—	± —	700	—	832	7·4
		±				

EMBANKMENT Transect 2 North South / (East) West

Tip, cinder Δ ballast. Spray to 1·5m.

F1 — coarse rather moribund Arrhenatheru

F2 — coarse Arrhenatherum grassland with low hawthorn Δ bramble, latter cut at top of slope. Very few nettles.

F3. — rank nettle, grass & herbs.

F	A	S±	Mgt	Tip	NLU	Widt m
1	—	± —	745	11		0·5
3	90°	±34°	744	11		3·4
1	—	± —	700	—	814	6·5
		±				

CUTTING Transect 1 North South / East (West)

F1 — bare rock with scree Δ soil crashed down into drainage ditch.

F2 — ledges with scattered calcicolous grasses, on limestone rock cutting. No herbs Δ sparse sprayed hawthorn.

F3 — grass slope of mixed calcicole Δ Calcifuge spp.. Herb Δ sp. rich.

F4 — low bramble/hawthorn Δ Arrhenatherum

F	A	S±	Mgt	Tip	NLU	Width m
2	90°	±90°	745	—		1·5
2	90°	±62°	745	—		2·5
2	90°	±35°	700	—		2·4
1	—	± —	700	—	805	7·0

CUTTING Transect 2 North South / (East) West

Tip, ballast Δ scree, where drainage pipes laid recently.

F2 — ledges on limestone rock cutting with exposed rock, cut Δ sprayed bramble Δ hawthorn Δ calcicole grasses. Veg. very sparse.

F3 — grass slope very similar to E. facing

F4 — low rank bramble Δ grass + hawthorn with a hawthorn hedge at boundary

F	A	S±	Mgt	Tip	NLU	Widt m
2	270°	±40°	744	13		1·0
2	270°	±63°	726	—		2·4
2	270°	±34°	726	—		3·2
1	—	± —	700	—	800	7·4

SITE OF BIOLOGICAL INTEREST	REGN / DIVN / AREA / SITE / STATUS	96.
	W / WdE / BR / 865 / DISC.	Ygom.

SITE NAME Wanstrow COUNTY Somerset MP 1¾ DATE 17.5.78 WEEK NO 20

MAP REF 717409 SHEET NO ST74 RAILWAY LINE Cranmore branch RECORDER gom/AM

ALTITUDE 550' GEOLOGY Jurassic—Great Oolite: Forest Marble, mainly clay.

MAJOR VEGETATION TYPES

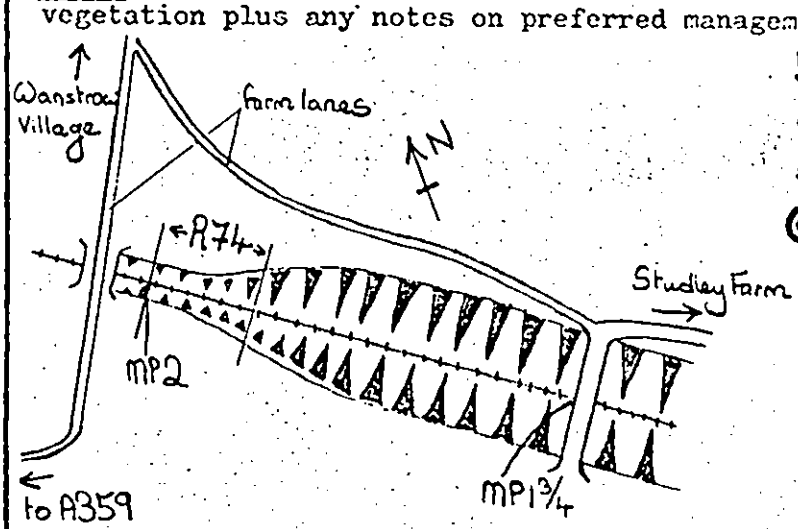
Side of track	NE	NE	NE	SW	SW	SW		
Dist from access	100→400m.	100→400m	100→400m.	100→400m.	100→400m	100→400m.		
Landform	2	2	2	2	2	2		
Slope	± 35°	± 32°	± 34°	± 30°	± 36°	± 29°	±	±
Aspect	215°	215°	215°	35°	35°	35°		
Vegn	129	107	221	149	105	221		
Mgt	726	708	700	700	708	700		
Tipping	—	—	—	—	—	—		
N Land use			804			804		
Width	c.30m.	c.30m.	4m.	5m.	17m.	5m		

MINOR VEGETATION TYPES

The vegetation toward A74 is coarser & similar to that described by the relevant quadrats

SITE MAP: Indicate precisely reference points and limits of section surveyed.

NOTES: Continue on back or new sheet if necessary. Give word picture of site and vegetation plus any notes on preferred management.



Deep grassy cutting with scrub along upper edge by fence and becoming frequent on slope toward East.

(a) NE side — open Bromatum exactae with little woody growth & much litter. Locally heavily grazed and consequently richer in Festuca rubra and forbs. [columns 1 & 2 above, Tgras 129 & 107 respectively]. Near the fence mixed thorn-scrub and bramble with grassy patches [column 3]

(b) SW side — zone of rank grass & frequent Salix bushes all along lower edge of slope. [Tgra 149 — column 4]. Above this a loco mossy turf with no woody growth and abundant Ptiaracium sp. & Carex flacca co-dominants on moist steep slope. Patches of Tussilago here & there. Above this coarser grassland takes over and the upper edge is tall sycamore & ash scrub with primrose & wood-spurge common; patches of bramble & tall grass also [Tgras 105 & 221 [columns 5 & 6].

ASSESSMENT

Very good botanical locality with interesting variety of vegetation. Of outstanding conservation value in agricultural area where rye-grass leys account for most of the grassland. Good calcicolous grassland with several local species. Many well-used cuttings as this

QUADRAT RECORD 2 99 22

REGN / DIVN / AREA / SITE / QUADRAT: W / CF / NP / CE99 / T1Q2

SITE NAME Llandŵ MP 13 RECORDER jom/SBC DATE 27.6.78

LAND FORM* 2 ASPECT 90° SLOPE +35° WIDTH OF SLOPE 6.4m WEEK NO. 26 PH 5.4

VEGETATION HT (CM) 30 MGT 700 TIP —

1=Flat or bank to 1m
2=Cut
3=Emb
4=Ditch
5=Flat Cut
6=Flat Emb

Quadrat Size (4 m²) or 25 m²

Location of quadrat

4.9m.

NR=not rooted (but overhanging quadrat)

	CODE	COV
Festuca rubra	824	40
Anthoxanthum odo.	121	20
Arrhenatherum elatius	169	5
Trisetum flavescens	2105	10
Holcus lanatus	983	5
Sieglingia decumbens	1915	2
Rubus fruticosus s.l.	1728	—
Potentilla erecta	1588	10
Galium verum	888	10
Centaurea nigra	444	10
Poterium sanguisorba	1599	5
Plantago lanceolata	1487	5
Viola riviniana	2218	5
Achillea millefolium	7	2
Vicia cracca	2189	2
Hieracium diaphanum (det. P.D. Sell)	1828	2
Rumex acetosa	1734	—
Betonica officinalis	237	—
Lathyrus pratensis	1116	—
Heracleum sphond.	968	—
Pimpinella saxifraga	1476	—

Total Spp:- 21

	CODE	COV
Bare ground ✓ ant hill	4000	10
Litter ✓	4001	40
Bryophytes ✓	4003	—
Open water	4004	
Lichens	4005	
Exposed rock ✓	4007	2
Bare ballast	4008	
Bare cinder	4009	
Bare mixed ballast/cinder	4010	

Quadrat description: Herb-rich and quite species rich fescua/Anthoxanthum grassland on gentler slope above rock cutting (lower edge of quadrat just onto face). Several ant hills present. Calcicole spp. commoner on lower slope e.g. Poterium & Trisetum with fescua giving way gradually on upper slope to more calcifuge flora with Anthoxanthum & Potentilla erecta. Much litter

SITE NAME Llanfwrt

SITE REF. R100

DATE 27.6.18

CUT/EMB E

RECORDER Jom REF.

TRANSECT 1 2

GRASSES

26	Ag[redacted]	can
	[redacted]	REP
35	Agros	can
		STO
40		ten
41	Aira	car
42		pra
82	Alope	pen
84		myo
85		PRA
	Antho	odo
	ARRHE	ELA
220	Avena	fat
249	Brach	PIN
		syl
	Briza	med
262	Bromu	com
		ERE
268		lep
269		*mol
272		ram
113		ste
293	Calam	epi
597	Cynos	cri
	DACTY	GLO
627	Desch	cae
628		fle
813	Festu	ara
816		gig
821		*ovi
823		PRA
		*RUB
815	Festu	lol
933	Glyce	flu
934		max
961	Helic	pra
962		pub
	Holcu	LAN
984		mol
992	Horde	mur
993		sec
1087	Koele	cri
1182	Loliu	mul
1183		PER
1263	Melic	uni
1296	Miliu	eff
1307	Molin	cae
1344	Nardu	str
1454	Phala	aru
1461	Phleu	ber
2247		*PRA
1465	Phrag	com
1506	Poa	ang
1495		ANN
1499		com
1504		nem
		*PRA
1506		sub
		TRI
1915	Siegl	dec
	Trise	fla
2226	Vulpi	bro
2228		myu

WOODY – CLIMBERS

	Acer	cam
5		pse
2241	Aescu	hip
	Alnus	gla
239	Betul	pen
240		pub
276	Bryon	dio
289	Buxus	sem
2248	Calys	*sep
432	Casta	sat
528	Clema	vit
557	Coryl	ave
	Crata	mon
570		oxy
762	Euony	eur
810	Fagus	syl

	Fraxi	exc
	[redacted]	[redacted]
996	Humul	lup
1023	Ilex	aqu
1080	Junip	com
1144	Ligus	vul
	Lonic	per
	Malus	syl
1484	Pinus	syl
1588	Popul	tre
1611	Prunu	avi
1614		dom
1616		pad
		spi
1635	Quere	cer
1638		pet
1640		rob
1675	Rhamn	cat
1694	Ribes	nig
1696		syl
1697		uva
1705	Rosa	*
1707		arv
		*can
1709		can
1712		mic
1719		pim
1714		*rub
1722		*vil
1726	Rubus	cae
		*fru
3507	Salix	sp
1784		alb
1787		aur
1788		cap
1789		*cin
1790		cin
1793		fra
1801		pur
1805		vim
1814	Sambu	nig
1822	Sarot	sco
3508	Sorbu	*
1960		auc
1994	Spira	sal
2029	Svrin	vul
	Tamus	com
2039	Taxus	bac
548	Thely	san
2063	Tilia	cor
2112	Ulex	eur
2113		gal
2114		min
2115	Ulmus	car
		gla
2122		pro
2184	Vibur	lan
2185		opu

HERBS

	Achil	mil
9		pta
3501	Aeroc	cus
19	Adoxa	mos
20	Aegop	pod
21	Aethu	cyn
	Agrim	eup
46	Ajuga	rep
51	Alche	gla
57		ves
58		vul
60		xan
63	Alism	pla
64	Allia	pet
75	Alliu	urs
76		vin
98	Anaca	pyr
99	Anaga	arv
105	Anemo	nem
	Angel	syl
117	Anthe	arv
118		cot

125	Anthy	syl
126	Anth[redacted]	vul
134	Aphan	*arv
	Aphan	mod
151	Arcti	lap
152		min
167	Armor	rus
170	Artem	abs
175		vul
	Arum	mac
185	Asple	adi
		rut
		tri
208	Astra	gly
218	Atrip	pat
225	Ballo	nig
229	Barba	vul
231	Belli	per
234	Berul	ere
235	Beta	vul
237	Beton	off
243	Black	per
244	Blech	spi
3502	Brachy	rut
252	Brass	nig
296	Calam	asc
2249	Calli	*agg
		sta
309	Callu	vul
310	Calth	pal
320	Campa	rapunculo
322		rot
325	Capse	bur
328	Carda	fle
329		hir
331		pra
333	Carda	dra
334	Cardu	aca
337		nut
339		ten
350	Carex	bin
355		car
361		dem
369		divulsa
		flacca
		flava
381		hir
393		nig
396		otr
398		mur = pai
400		panicea
405		pil
412		rem
413		rip
357		spi
421		syl
427	Cardl	vul
433	Catab	aqu
	Catap	rig
	Centa	nig
446		sca
451	Centa	ery
461	Ceras	arv
462		atr
466		glo
		hol
469		sem
3503	Ceter	off
474	Chaen	min
476	Chaer	tem
477	Chama	ang
119	Chama	nob
480	Cheli	maj
481	Cheno	alb
484		bon
496		nib
	Chrys	leu
503		par
504		seg
2033		vul
506	Chrys	opp

509	Cicho	int
5[redacted]	[redacted]	[redacted]
514	Cirsi	aca
		arv
516		dis
517		eri
518		het
520		pal
522		vul
530	Clino	vul
540	Conin	mac
	Conop	maj
544	Convo	arv
735	Conyz	can
551	Conon	did
552		squ
571	Crepi	bie
572		cap
578		ves
592	Cymba	mur
596	Cynog	off
603	Cysto	fra
608	Dacty	fuc
609		inc
610		mac
612		pra
613		pur
620	Daucu	car
630	Descu	sop
640	Digit	pur
644	Diplo	mur
646	Dipsa	ful
647		pil
661	Dryop	dil
662		bor
664		*fil
670	Echiu	vul
675	Eleoc	pal
681	Elode	can
684	Empet	*nig
687	Endym	non
688	Epilo	ade
689		adn
692		hir
695		mon
696		obs
697		pal
698		par
	Equis	arv
713		flu
717		pal
720		syl
721		tel
726	Erica	cin
731		tet
745	Erodi	*cic
749		mos
759	Erysi	che
	Eupat	can
771	Eupho	exi
772		hel
777		peplus
2243	Euphr	*agg
830	Filag	ger
	Filip	ulm
834		vul
835	Foeni	vul
838	Fraga	ves
3504	Fumar	sp
847		cap
854		off
862	Galeob	lut
867	Galeop	spe
	Galiu	apa
875		cru
879		*mol
183		odo
882		pal
878		sax
888		ver
891	Genis	ang

893	Genis	tin
	Genti	[redacted]
900	Geran	col
907		dis
909		luc
911		mol
913		pha
914		pra
916		pus
917		pyr
		rob
921		syl
924	Geum	riv
925		urb
931	Glech	hed
941	Gnaph	uli
948	Gymna	con
955	Helia	cha
	Herac	sph
	Hiera	*pil
979	Hippo	com
981	Hippu	vul
1002	Hyosc	nig
1003	Hyper	and
1010		hirsutum
1011		hum
1006		mac
1014		per
1015		pul
1016		tet
3505	Hypnu	cup
1020	Hypoc	rad
1026	Impat	gla
1028		par
1030	Inula	con
1036	Iris	foe
1038		pse
1048	Jasio	mon
1050	Juncu	acuti
		art
1057		buf
1063		con
1067		eff
1070		inf
1075		squ
1077		ten
1084	Knaut	arv
1094	Lactu	ser
1095		vir
1098	Lamiu	alb
1099		amp
1103		pur
1104	Lapsa	com
1112	Lathy	mon
		pra
1129	Leont	aut
		his
1131		tar
1133	Lepid	cam
1139		het
	Linar	rep
1164		vul
1169	Linum	cat
1173	Liste	ova
1174	Litho	off
1191	Lotus	cor
1194		uli
	Luzul	cam
1204		mul
1207		pil
1209		syl
1210	Lychn	flo
1218	Lycop	arv
1219		eur
1221	Lysim	nem
1222		num
1227	Lythr	sal
1232	Malva	mos
1233		neg
1236		syl
1242	Matri	mat

1239	Matri	rec
1247	[redacted]	[redacted]
1250		lup
1252		sat
1264	Melil	alb
1265		alt
1267		off
1272	Menth	aqu
1273		arv
1290	Mercu	ann
1291		per
1298	Mimul	gut
1305	Moehr	tri
1312	Monti	fon
1315	Mycel	mur
1317	Myoso	arv
1319		cae
1320		ram
1321		dis
1322		sco
1333	Myrrh	odo
1343	Narci	pse
1348	Nastu	*off
1353	Nepet	cat
1361	Odont	ver
1363	Oenan	cro
1370	Oenot	bie
1375	Onobr	vic
	Ononi	rep
1378		spi
1379	Onopo	aca
1382	Ophry	api
1387	Orchi	mas
1393	Origa	vul
1396	Ornit	umb
1397	Ornit	per
1401	Oroba	ela
1404		min
1413	Oxali	ace
1424	Papav	arg
1426		dub
1430		rho
1431		som
1435	Parie	dif
1440	Pasti	sat
1442	Pedic	syl
1443	Penta	sem
1445	Petas	alb
1446		fra
1447		hyb
1449	Petro	cri
	Phyll	sco
1471	Picri	ech
1472		hie
1475	Pimpi	maj
		sax
1485	Plant	cor
		lan
1488		maj
1490		med
1514	Polyg	ser
1515		vul
1520	Polyg	are
1521		amp
1522		*avi
1525		bis
1527		con
1528		cus
1530		hyd
1531		lap
1536		nod
1537		per
1544	Polyp	vul
1546	Polys	acu
1548		set
3506	Potam	sp
1563		cri
1570		nat
1575		per
1576		pol
1584	Poten	ans

	Poten	ere
	[redacted]	[redacted]
	Poter	san
	Primu	ver
1607		vul
1610	Prune	vul
1619	Pteri	aqu
1625	Pulic	dys
1641	Radio	lin
1642	Rapun	acr
1643		*aqu
1645		aur
1647		bul
1649		fic
1651		flammula
1660		repens
1663		sce
1667	Rapha	rap
1672	Resed	lut
1673		luteola
1678	Rhina	*min
1704	Rorip	syl
1735	Rumex	*ace
		acetosa
1741		con
1742		crispus
1745		hyd
1746		lon
1748		obt
1751		pul
1753		san
1761	Sagin	ape
1766		nod
1767		pro
1809	Salvi	hor
1815	Sambu	ebu
1818	Sangu	off
1819	Sanic	eur
1821	Sapon	off
1830	Saxif	gra
1835		hyp
1843		tri
1846	Scabi	col
1047	Scirp	set
1865	Scrop	aqu
1867		nod
1875	Sedum	acr
1876		alb
1877		ang
1885		tel
1891	Senec	aqu
		eru
1899		jac
1902		squ
1903		syl
1904		vis
1905		vul
1912	Shera	arv
1916	Silau	sil
1258	Silen	alb
		dio
1923		vul
1930	Silyb	mar
1932	Sinap	alb
1933		arv
1934	Sison	amo
1938	Sisym	off
1945	Smyrn	olu
	Solan	dul
1949		nig
1951	Solid	vir
1952	Sonch	arv
1953		asp
1954		ole
1981	Sparg	ere
1987	Sperg	arv
2001	Stach	arv
2003		pal
2005		syl
2007	Stell	als

2009	Stell	gra
2010		hu[redacted]
2011		me[redacted]
2021	Succi	pra
2022	Symph	riv
2024	Symph	off
3509		x mjd
2036	Tarax	*lae
2034	Tarax	*arg
2035		*oli
2046	Teucr	scorod
2048	Thali	fla
2051	Thely	lim
2058	Thlas	arv
2060	Thymu	dru
2069	Toril	jap
2070		nod
2074	Trago	pra
2077	Trifo	arv
2080		cam
2081		dub
2083		fra
2085		hyb
		med
2090		och
2091		pra
2092		rep
2097		striatum
2102	Trigl	pal
1241	Tripl	mar
2109	Tussi	far
2111	Typha	lat
2125	Umbil	rup
	Urtic	dio
2128		ure
2136	Vacci	myr
2138		vit
2139	Valer	dio
2140		off
2150	Verba	nig
2157		thapsus
2159	Verbe	off
2161	Veron	agr
2163		ana
2165		arv
2166		bec
2167		cat
		cha
2169		fil
2171		hed
2172		mon
2173		off
2175		persica
2180		ser
	Vicia	cra
2191		hir
2197		sat
2198		sep
2202		tet
2204	Vinca	maj
2205		min
2206	Viola	arv
2210		hir
2214		odo
2217		rei
		riv
2220		tri

CODE	NAME	CODE	NAME	CODE	NAME	CODE	NAME	PUNCHING REF.
1126	Lemna minor							Not for field use
1664	Ranunculus tricho.							

RECORD W / CF / NP / R100 99.

SITE NAME Llantwit MP 11 RECORDER AM DATE 27.6.78 WEEK NO 26

LAND FORM 514 WEATHER Overcast but with odd bright periods. Medium NW breeze. Warm. MGT 700 726 745 TIP — TIME 1030 → 1230

	ANIMAL	R	F	LH
1	BIRDS	2	2	2
2	RABBITS	1	1	1
3	SMALL MAMMALS	1	2	2
4	LARGE MAMMALS	1	1	1
5	LEPIDOPTERA	2	3	2
6	OTHER INSECTS	2	2	2
7	OTHER INVERTS	2	2	2

HABITAT APPRAISAL ref. to NLV

Medium sized rock cutting with much grass on the slope & adjacent flat. Thence giving away to bramble & hawthorn near boundary where hedges of hawthorn have been left unmanaged. Quite a good locality producing varied animal habitats i.e. it is structurally diverse and reasonably species rich for plants. It is however not very extensive and there are several green lanes, shelter-belts and rough pastures locally, such that the BAs contribution is not outstanding.

VERTS & INVERTS SEEN ON BR LAND

BIRDS

Apus apus
Pica pica
Delichon urbica
Erithacus rubecula
Phylloscopus trochilus
Emberiza citrinella
Sturnus vulgaris
Corvus c. corone.
Larus argentatus.

OTHER VERTEBRATES

domestic dog.

INVERTS

Panaga aegeria
Pieris brassicae
Pieris rapae
Aglais urticae
Diptera
Crombus sp. Gammarus sp
Araneida
Lasius sp.
Bombus sp.
Aeshna grandis
Gerris sp.

CASUALTIES

/ / /

ADDITIONS - seen on NL but associated with BR land

Phasianus colchicus
Parus caeruleus
Columba palumbus
Alauda arvensis

?=reproduction
'=feeding
H=living habitat
)
2
5=good
i=nesting

TIPPING

1 = Very severe

11 = old

12 = In process of recolonization

13 = New, or very recent

2 = Moderate

21 = old

22 = In process of recolonization

23 = New, or very recent

3 = Light

31 = old

32 = In process of recolonization

33 = New, or very recent

[State whether composed of ballast and/or cinder
State whether thick-spread, in lines, in heaps or scattered]

N.B. Coding should go on Quadrat & Animal Records Forms also in boxes on Random & Cutting/Embankment forms

Type & composition in transect description and/or quadrat description.

Number and Location of Quadrats on Transects (1978):

(Ground Rules — Provisional)

I. Positioning of Transects:

Go to Access Point and determine position of closest 1/4 mile post (if its location is artificially affected by the Access Point — go to next).
Walk from Access Point to 1/4 mile post on right-hand side of track.
Transect 1 is at this point.
Transect 2 is 100 paces further on, on the same side as #1.
Transect 3 is opposite #2.
" 4 " " #1.

II. Number of Quadrats per Transect:

Geometrical relationship between length of transect & number of quadrats

0 → 5 m. — 1 quadrat
5 → 10 m. — 2 "
10 → 20 m. — 3 "
20 → 40 m. — 4 "
40 → 80 m. — 5 "
> 80 m — 6 quadrats.

III. Location of Quadrats:

Divide the transect into equal segments — divide by the appropriate number of quadrats.

e.g. If width of bank is 18 metres
" 3 quadrats — one in each 6 metre portion.

Using random number tables independently for each segment, produce a centre point for the quadrat on the transect line.

e.g. Random numbers 5, 3 and 1 in 18 metre bank
0 → 6 metres, quadrat at 5 metres
7 → 12 " , " " 9 (6+3) metres.
13 → 18 " , " " 13 (12+1) metres.

IV. Procedure for woodland & scrub — closed canopy woody vegetation over man height.

Use 25 m² instead of 4 m² for placing centres
Geometrical relationship between length of transect and number of quadrats

0 → 10 m — 1 quadrat
10 → 20 m — 2 quadrats
20 → 40 m — 3 quadrats
etc. etc.

Proceed with quadrat positioning as before and at the centre point record a 4 m² separately as well as the large 25 m².

APPENDIX 5

ADDITIONAL PLANT SPECIES ON SOUTHERN AND WESTERN REGIONS

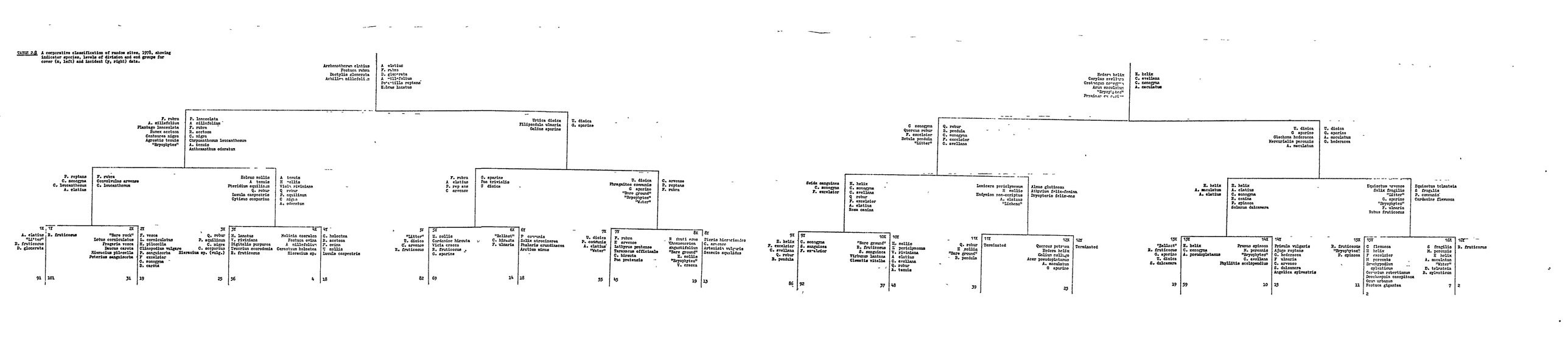
Appendix 5. Additional plant species found on Southern and Western Regions during 1978.

Acanthus mollis L.
Acinos arvensis (Lam.) Dandy
Adiantum capillus-veneris L.
Agropyron junceiforme A. & D. Löve
Agropyron pungens (Pers.) Roem. & Schult.
Agrostis gigantea Roth.
Agrostis setacea Curt.
Allium triquetrum L.
Althaea rosea (L.) Cav.
Ammophila arenaria (L.) Link
Anaphalis margaritacea (L.) Benth.
Anthemis cupiana
Aquilegia vulgaris L.
Arabidopsis thaliana L.
Arabis caucasica Willd.
Arabis hirsuta (L.) Scop.
Arenaria s. leptoclados (Reichb.) Guss.
Arenaria s. serpyllifolia L.
Asparagus o. officinalis L.
Aster novae-angliae L.
Aster novi-belgii L.
Athyrium filix-femina (L.) Roth.
Atriplex hastata L.
Atriplex littoralis L.
Barbarea intermedia Bor.
Barbarea verna (Mill.) Asch. & Gr.
Bilderdykia aubertii (L. Henry) Molden.
Brassica oleracea L.
Brassica rapa L.
Briza maxima L.
Bromus inermis Leyss.
Buddleja davidii Franch.
Calystegia silvatica (Kit.) Grisob.
Campanula glomerata L.
Campanula medium L.
Campanula trachelium L.
Campanula alliariifolia Willd.
Carex arenaria L.
Carex distans L.
Carex extensa Good.
Carex paniculata L.
Carex pendula Huds.
Carex pseudocyperus L.
Carex rostrata Stokes
Carpinus betulus L.
Carum verticillatum (L.) Koch.
Centranthus ruber (L.) D.C.
Cephalanthera damasonium (Mill.) Druce
Cerastium tomentosum L.
Chamaecyparis lawsoniana (A. Murr.) Parl.
Cheiranthus cheiri L.
Chrysanthemum maximum Ramond
Cordyline australis Hook f.
Cotoneaster horizontalis Decaisne
Cotoneaster microphyllus Wall.
Cotoneaster simonsii Baker
Cortaderia selloana (J.S.&J.H. Schult) Aschers & Graebn.
Crocosmia x crocosmiiflora (Lemoine) N.E. Br.
Cynodon dactylon (L.) Pers.
Daucus carota ssp. gummifer Hook
Delphinium ambiguum L.
Dianthus armeria L.
Diplotaxis tenuifolia (L.) D.C.
Dryopteris carthusiana (Viller) H.P. Fuchs.
Epilobium brunnescens (Cockayne) Raven & Engelham
Epilobium lanceolatum Seb. & Mauri
Epipactis helleborine (L.) Crantz
Epipactis palustris (L.) Crantz
Erica lusitanica Rudolphi
Erigeron acer L.
Erigeron mucronatus DC.
Erophila verna (L.) Chevall.
Euphorbia amygdaloides L.
Euphorbia esula ss L.
Euphorbia cyparisslas L.
Euphrasia nemorosa (Pers.) Wallr.
Euphrasia pseudokerneri Pugsl.
Euphrasia tetraquetra (Breb.) Arrond.
Festuca ovina L. ssp. tenuifolia (Sibth.) Peterm.
Ficus carica L.
Fragaria x ananassa Duchesne
Fumaria boraei Jord.
Geranium rotundifolium L.
Geranium sanguineum L.
Glaux maritima L.
Glyceria plicata Fr.
Gymnocarpium robertianum (Hoffm.) Newm.
Halimione portulacoides (L.) Aell.
Hesperis matronalis L.
Hieracium spp. L.
Hieracium umbellatum L.
Hordelymus europaeus (L.) Harz.
Hordeum vulgare L.
Hydrangea spp. L.
Hydrocotyle vulgaris L.
Hebe spp. Comm.
Hypericum calycinum L.
Hypericum hircinum L.
Juglans regia L.
Juncus acutus L.
Juncus maritimus Lam.
Juncus tenuis Willd.
Kniphofia sp. Moench

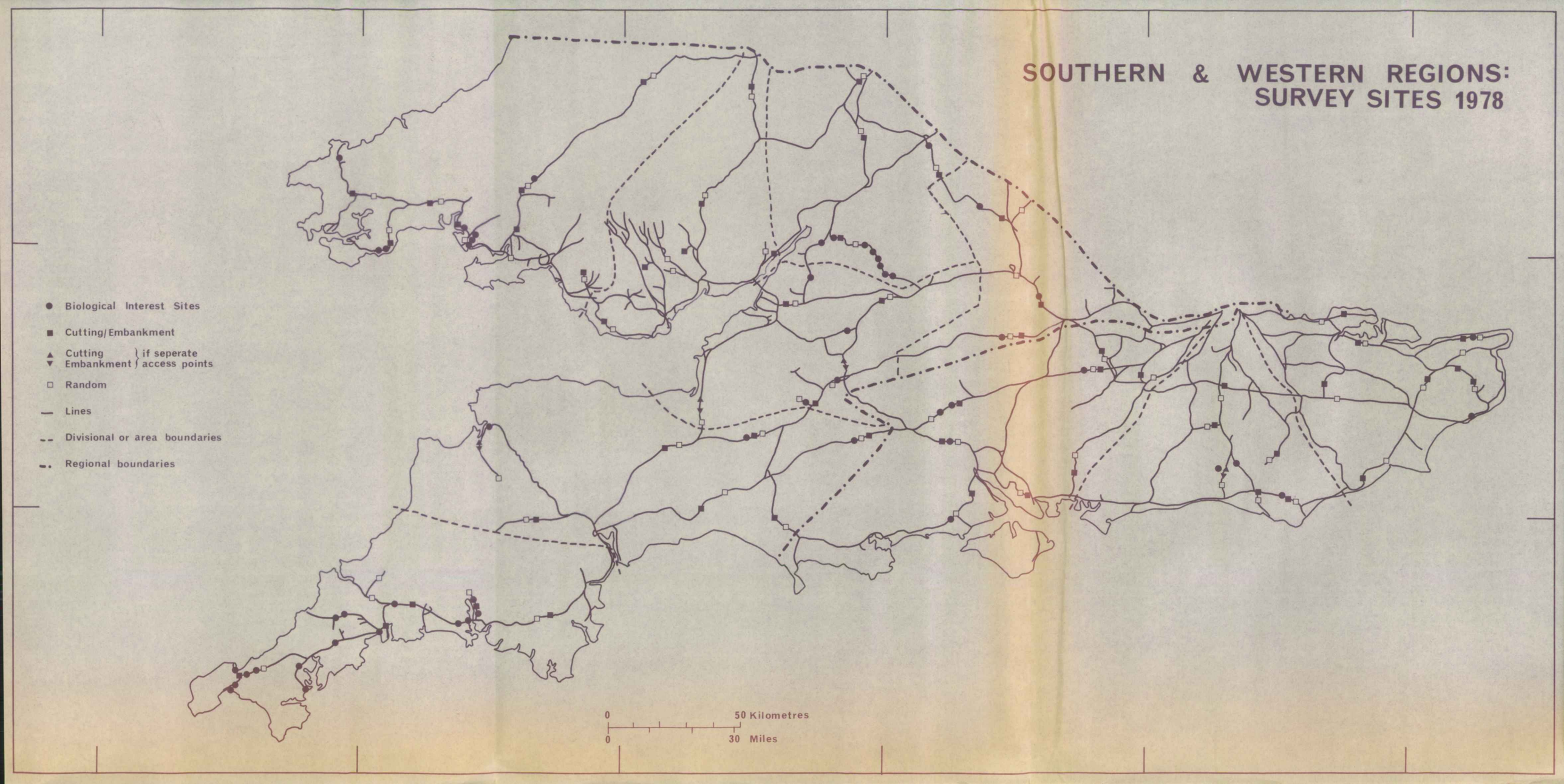
Laburnum anagyroides Medic.
Lathyrus latifolius L.
Lathyrus nissolia L.
Lathyrus odoratus L.
Lathyrus palustris L.
Lathyrus sylvestris L.
Lathyrus tuberosus L.
Lavatera arborea L.
Lemna minor L.
Lemna trisulca L.
Lepidium latifolium L.
Ligustrum ovalifolium Hassk.
Linaria dalmatica (L.) Mill.
Linaria purpurea (L.) Mill.
Linaria supina (L.) Chazelles
Linum bienne Mill
Lonicera japinoca Thunb.
Lunaria annua L.
Lupinus arboreus Sims
Lupinus polyphyllus Lindl.
Lycium barbarum L.
Lysimachia vulgaris L.
Mahonia aquifolium (Pursh.) Nutt.
Melampyrum pratense L.
Mentha rotundifolia (L.) Huds.
Mentha spicata L.
Menyanthes trifoliata L.
Misopates orontium (L.) Raf.
Monstera sp. Schott.
Myosotis laxa Leam.
Myosotis sylvatica Hoffm.
Myosoton aquaticum (L.) Moench.
Myrica gale L.
Myriophyllum spicatum L.
Narcissus x biflorus Curtis
Nasturtium microphyllum (Boenn) Rchb.
Oenothera erythrosepala Borbas
Ophioglossum v. vulgatum L.
Orchis morio L.
Osmunda regalis L.
Oxalis floribunda Lehm.
Parthenocissus tricuspidata (Seib. & Zuch.) Planch.
Phleum pratense s.s. L.
Picea sitchensis (Bong.) Carr
Pinus radiata Don.
Plantago maritima L.
Platanthera bifolia (L.) Rich.
Polygala calcarea F.W. Schultz.
Polygonatum multiflorum (L.) All.
Populus x canadensis Moench
var. serotina (Hertig) Rehd.
Populus gileadensis Rouleau
Potamogeton berchtoldii Fieb.
Potamogeton lucens L.
Potentilla anglica Laicharding
Potentilla x italica Lehm.
Potentilla recta L.
Prunus laurocerosus L.
Pseudotsuga menziesii (Mirb.) Franko.
Puccinellia distans (Jacq.) Parl.
Puccinellia maritima (Huds.) Parl.
Pulmonaria longifolia (Bast.) Bor.
Pyrus communis L.
Quercus ilex L.
Ranunculus circinatus Sibth.
Ranunculus hederaceus L.
Raphanus maritimus Sm.
Rhododendron ponticum L.
Ribes sanguineum Pursh.
Rheum sp. L.
Robinia pseudacacia L.
Rubia peregrina L.
Sagina apetala apetala Ard.
Salicornia ramosissima Woods.
Salix cinerea L. oleifolia Macreight.
Salix r. repens L.
Salix r. argentea (Sm.) G. & A. Camus
Salvia pratensis L.
Scrophularia scorodonia L.
Scutellaria galericulata L.
Sedum forsteranum Sm.
Sedum reflexum L.
Serratula tinctoria L.
Sisymbrium altissimum L.
Sisymbrium orientale L.
Soleirolia soleirolii (Req.) Dandy
Solidago canadensis L.
Sorbus aria s.s. L.
Spartina anglica C.E. Hubbard
Thymus pulegioides L.
Tilia x vulgaris Hayne
Verbascum virgatum Stokes
Veronica longifolia L.
Vicia sativa ssp. nigra (L.) Ehrh.
Vicia sylvatica L.
Viola canina L.
Viola x wittrockiana Gams
Vulpia membranacea (L.) Dum.
Zannichellia palustris L.

770 species recorded during 1978.

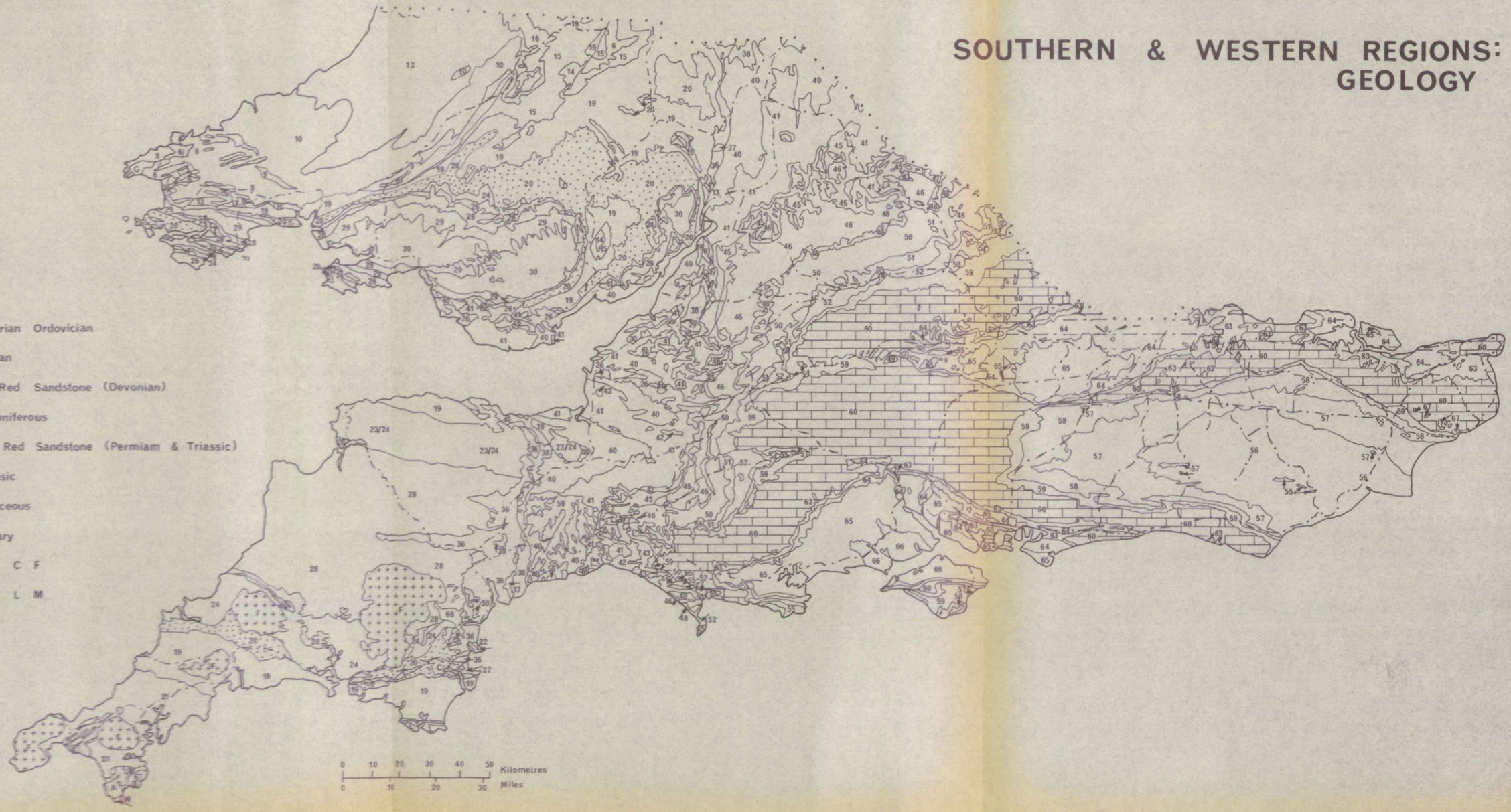
TABLE 2.8 A comparative classification of random sites, 1978, showing indicator species, levels of division and end groups for cover (x, left) and incident (y, right) data.



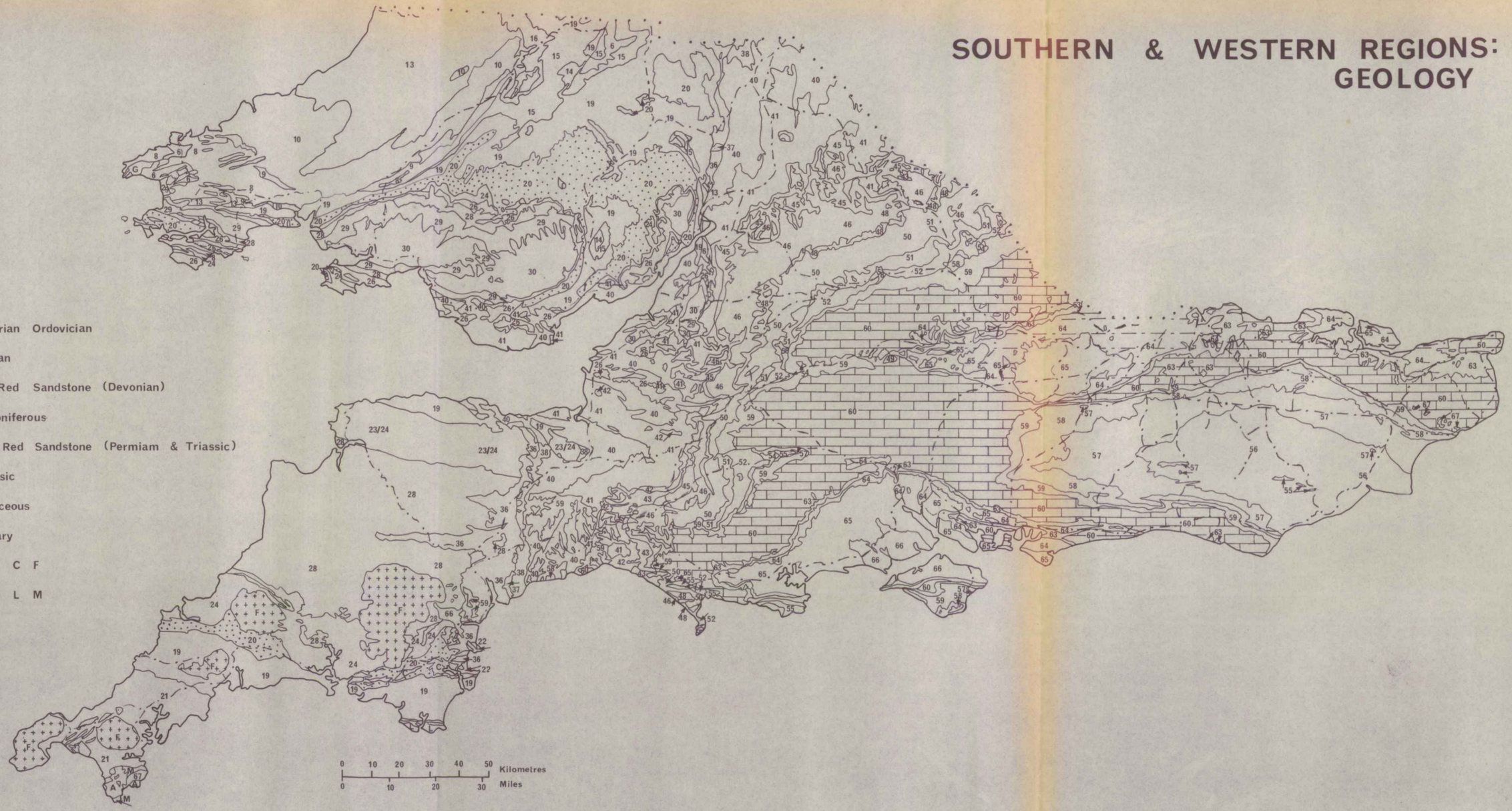
SOUTHERN & WESTERN REGIONS: SURVEY SITES 1978



SOUTHERN & WESTERN REGIONS: GEOLOGY



SOUTHERN & WESTERN REGIONS: GEOLOGY



SOUTHERN & WESTERN REGIONS: SOILS